This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

HARVARD
MEDICAL LIBRARY

IN THE
Francis A. Countway
Library of Medicine
BOSTON

THE

TRANSACTIONS

OF THE

AMERICAN

MEDICAL ASSOCIATION.

INSTITUTED 1847.

VOL. XXIII.

PHILADELPHIA:
PRINTED FOR THE ASSOCIATION.
COLLINS, PRINTER, 705 JAYNE STREET.
1872.

HARVARD UNIVERSITY
SCHOOL OF MEDICINE AND PUBLIC HEALTH
LIBRARY

23 DEC 1931

Gift
THE LANE MEDICAL LIBRARY

41

By a Resolution passed at the session of 1851, the Committee of Publication were instructed to print conspicuously, at the beginning of the volume of the *Transactions*, the following disclaimer:—

"The American Medical Association, although formally accepting and publishing the Reports of the various Standing Committees, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

CONTENTS.

	PAGE
Minutes of the Twenty-Third Annual Meeting of the American Medical Association	9
Report of the Committee of Publication	77
Report of the Treasurer	79
Address of D. W. Yandell, M.D., President of the Association	83
Report of the Librarian	105
Report of the Committee on Medical Education	115
Report of the Committee on Medical Literature	123
Report of the Section on the Practice of Medicine and Obstetrics	139
Clinical Thermometry. By E. Seguin, M.D., of New York	143
Report of the Section on Medical Jurisprudence, Hygiene, and Physiology	155
Report on the Structure of the White Blood Corpuscle. By Jos. G. Richardson, M.D., of Pennsylvania	159
On the Present Condition of Vaso-Motor Physiology. By Henry Hartshorne, M.D., of Pennsylvania	181
Report of the Section on Materia Medica and Chemistry	191
Partial Report on the Production of Vaccine Virus in the United States. By Ephraim Cutter, M.D., of Massachusetts	197
Report of the Section on Medical Topography, Meteorology, and Epidemics	237
Second Report on the Climatology and Epidemics of West Virginia. By E. A. Hildreth, M.D.	243
Report on the Climatology and Epidemics of South Carolina. By Manning Simons, M.D.	273
Report on the Climatology and Epidemics of California. By F. W. Hatch, A.M., M.D.	333
Report on the Climatology and Epidemics of Delaware. By L. P. Bush, M.D.	369
Report on the Climatology and Epidemics of Arkansas. By Geo. W. Lawrence, M.D.	395
Report on Climatology and Epidemics of Pennsylvania for 1871, particularly the Epidemic History of Smallpox in Philadelphia. By W. L. Wells, M.D.	435
Report on the Climatology and Epidemics of Minnesota. By Charles N. Hewitt, M.D.	459
Report on Meteorology of New Jersey. By E. M. Hunt, M.D.	473
Report of the Section on Surgery and Anatomy	477
On the Recent Advances in the Operations for Cataract. By H. Knapp, M.D., of New York	509
Case of Vesical Calculi with Polypi of the Prostate Gland. By W. H. Mussey, M.D., of Ohio	519

PAGE

On Treatment of Cancer by Electrolysis. By W. H. Mussey, M.D., of Ohio 523

Removal of the Upper Portion of the Left Femur for Disease of the Hip-Joint. By W. F. Peck, M.D., of Iowa 529

Remarks upon the Soft Palate and Adjacent Parts in Health and Disease. By Harrison Allen, M.D., of Pennsylvania 535

The Principles involved in the Treatment of Fractures of the Extremities with the Starch Bandage, Illustrated with a New Modification of that Dressing. By Charles N. Hewitt, M.D., of Minnesota 561

Report on American Medical Necrology. By J. D. Jackson, M.D., of Kentucky 571

Prize Essay: What Physiological Value has Phosphorus as an Organismal Element? An Essay to which was awarded the Prize of the American Medical Association for the year 1872. By Samuel R. Percy, M.D., of New York 607

Plan of Organization 661

Code of Medical Ethics 677

Officers and Permanent Members 693

APPENDIX.

A Nomenclature of Diseases, with the Reports of the Majority and of the Minority of the Committee thereon.

MINUTES

OF THE

TWENTY-THIRD ANNUAL MEETING

OF THE

AMERICAN MEDICAL ASSOCIATION,

Held in the City of Philadelphia, May 7th, 8th, 9th, and 10th, 1872.

THE Association assembled at Horticultural Hall, on Tuesday, May 7, at 11 A.M., and was called to order by the President, DAVID W. YANDELL, M.D., of Kentucky, assisted by Vice-Presidents THOMAS M. LOGAN, M.D., of California, CHARLES L. IVES, M.D., of Connecticut, R. F. MICHEL, M.D., of Alabama, and J. K. BARTLETT, M.D., of Wisconsin.

The Permanent Secretary, W. B. ATKINSON, M.D., the Assistant Secretary, D. MURRAY CHESTON, M.D., and the Treasurer, CASPAR WISTER, M.D., all of Pennsylvania, and the Librarian, F. A. ASHFORD, M.D., of the District of Columbia, were also present.

The proceedings were opened with prayer by the Right Rev. WM. BACON STEVENS, M.D., D.D., LL.D., Bishop of the Protestant Episcopal Church in Pennsylvania.

Prof. ROBERT E. ROGERS, M.D., of Pennsylvania, on behalf of the profession of Philadelphia, welcomed the delegates in the following remarks:—

Gentlemen, Delegates to the American Medical Association:

It is with unfeigned pleasure, that, as chairman of the Committee of Reception, on behalf of the medical profession of Philadelphia, I extend to you a sincere and cordial welcome to our midst.

Gathered to-day in this hall are representatives of our profession

from every quarter of this vast country, reaching from the city of the "Golden Gate" to the capes of the Chesapeake, from the granite hills of Maine to the waters of the Gulf of Mexico, covering a domain of twenty-four parallels of latitude and fifty degrees of longitude, and embracing a population, of whose health its members are the guardians, numbering not less than thirty-eight millions of men, women, and children.

With these boundaries, this area possesses features of climate, a meteorology and a geology, more diversified and extensive than those of any other single country on the face of the earth. What may we not hope of benefit to science and humanity by observations made upon these in their connection with disease and hygiene by so many intelligent laborers in the field!

Meeting here on this 25th anniversary of the organization of the American Medical Association, there are brought together men of every type, of high tone, loyal to their profession, strong men and true; men of sparkling genius, of varied and solid attainments, those who have grown gray in their vocation, laden with the golden harvest of a life's long experience, and those blessed with youth, energy, and ambition, engaged in laborious research, all ready to lay their individual contributions upon the altar of our profession.

In view of the reflections which here arise, what a spectacle of "moral grandeur" in possible achievements in the cause of suffering humanity does this assemblage present!

More than any other department of human knowledge does medicine appropriate the laws of the other positive sciences as parts of its organic whole, modifying and assimilating them and finding in them sustenance and warmth and life. It is indeed the highest application of the truths of the other departments of knowledge directed to the beneficent end of preserving health and assuaging physical pain. It may, perhaps, be not unaptly compared to some *vast sea*, receiving the contributions from a thousand perennial streams flowing from distant and widely separated regions, and then dispensing the commingled waters on the wings of the ever moving winds, to spread their vivifying renovating showers over the wide circuit of the globe.

Since the organization of our Association, as by curious coincidence, a new era has been inaugurated; marvellous progress has been made in the developments of science bearing upon human comfort and the mitigation of disease. Thus, the electric telegraph,

the vast extension of the iron track, the introduction of anæsthesia, and the device of various instruments of precision for the exploration and cure of the maladies of our race. These grand opportunities and great advances have been within the reach of all; therefore, as a natural result, our numbers have continued to increase and the value of our Transactions greatly to improve, thus securing an unabated prosperity to our organization.

Whatever qualifications may be made as to the amount of positive knowledge contributed through such annually recurring gatherings as these, it cannot be denied that they exercise personally a most wholesome elevating influence upon the members of the profession. They serve to strengthen old friendships and form new ones, to dissipate prejudices, to sustain self-respect, and cultivate a spirit of charity and humanity, and through the interchange of opinions and the abrasion of thought to brush away the cobwebs from the dusty corners of our brains—to sharpen the battle-axe which has grown rusty with disuse, and to lift us out of the monotonous groove of life in which we have been wont to move; leaving pleasant and cheering memories, which, like the arctic twilight, linger in the sky to meet the coming dawn of the next returning day.

The present is the third occasion of our meeting in the city of Philadelphia, the earliest medical centre of our country, which has long since become the vigorous and lusty sire of many a stalwart son. And here let us congratulate ourselves and the world at large upon the vindication of those principles which have ever guided her medical affairs. As the genuine coin is liable to counterfeit, so have unscrupulous men aimed to speculate upon her fair name by spurious imitations. Thanks to a wise legislation, the atmosphere has been purified, and the parties engaged in the *fraudulent* issue of diplomas have been deprived of their charters and their institutions abolished.

The first meetings of this Association were marked by harmony and good will throughout; so may it be now, and may the blessing of the "Author of peace and lover of concord" rest upon us and guide our deliberations.

Once more, then, my friends, offering you our warmest greetings and a hearty welcome to our hospitalities, I give place to your further proceedings.

Dr. EDWARD HARTSHORNE, of Pennsylvania, chairman of the Committee of Arrangements, then said:—

Mr. President and Gentlemen:

As chairman of the Committee of Arrangements, I beg leave, in behalf of that committee, to add our cordial salutation to the eloquent greeting which we have just heard with so much interest from the chairman of the Committee of Reception. We are very glad to have reached this stage of the work of preparation; and take great pleasure in reporting the arrangements as sufficiently complete for the purposes of the present meeting.

Not less gratified are we to meet with so large a body of delegates already registered at the opening of the session. It is much the largest number that has thus assembled on any similar occasion. There is every reason for believing, also, that it is as intelligent and well informed and well educated a body of our profession as it is a large one.

We cannot forget that the sum of knowledge and skill and superior education—and with these the actual intelligence—are rapidly and greatly increasing in our medical profession, as they are in all the professions, and among the people, of our country.

We must believe, therefore, that this assemblage of the representatives of the medical institutions, and medical men, from every part and quarter of our country, has not come together here for any other purpose and interest than those of science and of our profession, and of a common and truly social brotherhood. Under this impression we have endeavored to make such arrangements as may satisfy these professional and scientific purposes—such as may encourage these interests and furnish them with food convenient for them.

First, by preparing a museum or collection of objects of scientific and professional character. It is neither large nor very comprehensive, nor does it pretend to represent the whole and the latest advances, even in this city—still less of the country and elsewhere. It is, nevertheless, a collection of which we have no reason to be ashamed. It is one for the excellence of which we are very grateful, and most happy to acknowledge our obligations, to contributors and exhibitors, and to the efficient committeemen and aids who have made it the admirable success it has proved itself to be.

Secondly: with the same or a still greater sense of obligation, we may say still more, if possible, of the exhibition of microscopes and microscopic objects which will be offered to us by the Biological and Microscopical Section of the Academy of Natural Sciences, in the foyer or upper hall, to-night.

During the conduct of the microscopical reception, we will have in the balcony, for the entertainment of those who are in the lower hall, a promenade concert. Then we are to have scientific lectures, with attractive demonstrations, on the succeeding evenings of Wednesday and Thursday. The Wednesday lecture will be by Dr. H. D. NOYES, of New York, on Ophthalmoscopic Appearances represented by means of magic lantern transparencies. After this will come a lecture by Prof. ROGERS, with exhibition of Electrical Phenomena. The Thursday lecture will be given by Dr. J. SOLIS COHEN, with experimental demonstrations on Sound.

On Wednesday evening, the delegates will be received at the houses of Prof. HODGE and Dr. WM. H. PANCOAST. Prof. JOSEPH PANCOAST having been unexpectedly called away from the city, under a previous engagement, his son, Dr. WM. H. PANCOAST, has kindly taken his father's place as the host to the Association, and will receive the delegates at his own house, S. W. corner of Walnut and 11th Streets, instead of his father's house in Chestnut Street.

On Thursday evening the delegates will be received by Col. THOS. A. SCOTT, at his mansion, on the S. E. corner of 19th Street and Rittenhouse Square.

On Friday afternoon we are to have an excursion to Fairmount Park, with a collation at the Belmont pavilion. To the excursion and to all of the exhibitions, the ladies with the delegates are most cordially invited. We hope also to have them at the exhibition and concert of this evening, and at the museum and the lectures, as well as at the park excursion.

He then presented, for confirmation, the following list of delegates and permanent members, registered as in attendance:—

ALABAMA.

State Medical Society,	EGBERT BEALE JOHNSTON, JOHN FOOTE JOHNSTON, JOHN S. LYNCH, SAMUEL P. SMITH, J. S. WEATHERLY.
Medical and Surgical Society of Montgomery,	WM. O. BALDWIN, A. GINDRAT, B. RUSH JONES, R. F. MICHEL.
Mobile Medical Society,	T. SIDNEY SCALES.

Mobile U. S. Marine Hospital,	O. L. CRAMPTON.
Mobile Pathological Society,	WM. HENDERSON.
North Alabama Medical Association,	J. P. PRIDE.

ARKANSAS.

State Medical Society,	R. G. JENNINGS.
Pope County Medical Society,	A. H. SCOTT.

CALIFORNIA.

State Medical Society,	HENRY M. FISK, J. C. TUCKER, W. T. WYTHE.
Sacramento Society for Medical Improvement,	W. R. CLUNESS.

COLORADO.

Territorial Medical Association,	W. F. MCCLELLAND, W. H. WILLIAMS.
Permanent Member,	JOHN ELSNER.

CONNECTICUT.

State Medical Society,	ASHBEL WOODWARD.
Fairfield County Medical Society,	R. M. GRAY, MOSES B. PARDEE, GEO. L. PORTER.
Hartford County Medical Society,	CHAS. CARRINGTON, GEO. C. JARVIS, R. STRICKLAND.
Medical Institution of Yale College,	CHAS. L. IVES.
Middlesex County Medical Society,	CORNELIUS E. HAMMOND, S. W. TURNER.
New Haven County Medical Society,	B. F. HARRISON, ALFRED NORTH.
New Haven Medical Association,	GEO. BRONSON FARNAM, R. S. IVES, L. J. SANFORD.
New London Co. Medical Society,	ISAAC G. PORTER.
Windham County Medical Society,	T. MORTON HILLS.
Permanent Members,	B. H. CATLIN, H. M. KNIGHT.

DELAWARE.

State Medical Society,	H. F. Askew, Lewis P. Bush, Robert C. Ellegood, David Hall, W. N. Hamilton, R. S. W. Hirons, Isaac Jump, W. Marshall, R. R. Porter, Chas. H. Richards, Irving S. Vallandigham.
Permanent Member,	Thos. C. Rogers.

DISTRICT OF COLUMBIA.

Clinico-Patholog. Soc. Washington,	C. H. A. Kleinschmidt.
Columbia Hospital,	H. R. Porter.
Medical Association (D. C.),	F. A. Ashford, R. V. Aulick, H. H. Barker, W. B. Drinkard, C. W. Franzoni, A. W. Miller, Smith Townshend.
Medical Department, Georgetown College,	J. G. F. Holston, Sr. F. Howard.
Medical Society of the District of Columbia,	S. C. Busey, Cornelius Boyle, W. P. Johnston, W. G. H. Newman, J. M. Toner, Grafton Tyler, Joseph Walsh.
Washington Asylum,	Charles M. Ford.
U. S. Marine Hosp. (Washington),	H. W. Sawtelle.
Permanent Members,	J. H. Baxter, S. S. Bond, Gideon S. Palmer, Robert Reyburn.

GEORGIA.

Georgia Medical Association,	ROBT. B. RIDLEY, J. S. TODD, W. F. WESTMORELAND.
Georgia Med. Society of Savannah,	RICHARD D. ARNOLD.
Permanent Member,	THOS. S. POWELL.

ILLINOIS.

State Medical Society,	N. G. BLALOCK, E. P. COOK, N. S. DAVIS, JOS. O. HAMILTON, D. M. VOSBURGH, M. W. WALTON, E. R. WILLARD.
Adams County Medical Society,	G. W. COX, HENRY W. KENDALL.
Æsculapian Society of the Wabash Valley,	A. J. MILLER, L. L. TODD.
Chicago Medical College,	RALPH N. ISHAM.
Chicago Medical Society,	W. A. KNOX, SWAYNE WICKERSHAM.
Lee County Medical Society,	G. W. HEWITT.
Macon County Medical Society,	W. J. CHENOWETH.
Morgan County Medical Society,	THOS. J. PITNER, DAVID PRINCE.
Rockford Medical Association,	C. H. RICHINGS.
Peoria Medical Association,	JOSEPH C. FRYE, ISRAEL J. GUTH.
Permanent Members,	A. L. MCARTHUR, M. SHEPHERD.

INDIANA.

State Medical Society,	F. W. BEARD, T. B. HARVEY, R. E. HAUGHTON, J. E. LYONS, GEO. W. MEARS, THEOPHILUS PARVIN, THAD. M. STEVENS, L. D. WATERMAN.

Evansville Medical Society,	S. W. THOMPSON.
Indiana Medical College,	J. A. COMINGER, R. N. TODD.
New Castle Medical Society,	I. MENDENHALL.
Permanent Members,	W. H. MYERS, ALEX. J. MULLEN, GEO. SUTTON.

IOWA.

Clinton County Medical Society,	D. LANGAN.
Dubuque County Medical Society,	JAS. COCHRAN LAY, G. M. STAPLES.
Iowa and Illinois Central District Medical Association,	E. H. HAZEN.
Med. Department State University,	W. F. PECK.
North Iowa Medical Society,	FRED. ANDROS.
Scott County Medical Society,	A. W. CANTWELL.

KANSAS.

State Medical Society,	A. H. LAMPHIER, S. F. NEELY.

KENTUCKY.

State Medical Society,	D. D. CARTER, JOHN DILLARD, DUDLEY S. REYNOLDS, HENRY M. SKILLMAN, L. BEECHER TODD, ORRIN D. TODD, DAVID W. YANDELL.
Boyle County Medical Society,	JOHN D. JACKSON.
College of Physicians and Surgeons (Louisville),	LEWIS ROGERS, JOHN THRUSTON.
Covington and Newport Med. Soc.,	CHAS. F. THOMAS.
Louisville Medical College,	J. M. KELLER.
Medical Department University of Louisville,	J. M. BODINE, J. W. HOLLAND.

MAINE.

Maine Medical Association,	S. Fitch, Seth C. Gordon, Stephen H. Weeks.
Medical School of Maine,	A. B. Palmer.
Permanent Member,	Calvin Seavy.

MARYLAND.

Medico-Chirurgical Faculty,	A. B. Arnold, B. A. Dougherty, W. J. C. Duhamel, A. Friedenwald, E. L. Howard, John Morris, Saml. F. Powell, Samuel P. Smith, D. A. O'Donnell, John M. Stevenson, G. L. Taneyhill, W. Chew Van Bibber, Philip C. Williams.
Allegheny County Medical Society,	Jas. M. Porter.
Baltimore Medical Association,	S. L. Frank.
Baltimore Pathological Society,	Jas. A. Stewart.
Harford County Medical Society,	S. B. Silver.
Medical and Surgical Society of Baltimore,	D. W. Cathell, A. W. Dodge, Thos. B. Evans, Frank Germon, Chas. J. Klueber, O. S. Mahon, D. M. Walshe.
University of Maryland,	Frank Donaldson, Wm. T. Howard.
Washington University (Baltimore),	C. W. Chancellor, E. J. Henkle.
Permanent Members,	Chas. H. Ohr, Edw. Warren.

MASSACHUSETTS.

Massachusetts Medical Society,	H. O. Adams, J. F. A. Adams, Robert Amory, Robt. F. Andrews, J. R. Bronson, Clarkson T. Collins, Ephraim Cutter, Chas. M. Duncan, Jas. R. Fairbanks, Geo. W. Grover, E. T. Learned, J. W. D. Osgood, G. G. Tucker, John B. Whitaker.
U. S. Marine Hospital,	Peter Pineo.
Permanent Members,	H. I. Bowditch, Wm. M. Cornell, Augustus Mason, Horace Richardson.

MICHIGAN.

State Medical Society,	A. R. Calkins, Robt. C. Kedzie, Chas. Shepard, C. M. Stockwell, G. W. Topping.
Flint Academy of Medicine,	Henry C. Fairbank.
St. Clair, Sanilac, and Lapeer County Medical Society,	C. H. Alden, Alfred Nash.
St. Joseph Valley Medical Society,	Chas. W. Backus.
University of Michigan,	Abm. Sager.

MINNESOTA.

State Medical Society,	E. C. Cross, J. E. Finch, Calvin G. Goodrich, Chas. N. Hewitt, Jas. B. McGaughey, W. H. H. Richardson, A. J. Stone.

MISSISSIPPI.

State Medical Society,	B. A. VAUGHAN.

MISSOURI.

State Medical Society,	THOS. B. LESTER, WM. M. MCPHEETERS, EDW. MONTGOMERY.
St. Joseph Medical Society,	W. R. HALL.
St. Louis Medical College,	E. H. GREGORY, JOHN T. HODGEN.
St. Louis Medical Society,	J. J. MCDOWELL, JOHN S. MOORE, M. A. PALLEN, A. J. STEELE.

NEBRASKA.

State Medical Society,	W. H. HESS.

NEW HAMPSHIRE.

State Medical Society,	VAL. MANAHAN, J. S. WHEELER.
Moose-Hillock Medical Association,	WM. CHILD, JOHN MCNAB.

NEW JERSEY.

State Medical Society,	CHAS. HODGE, SAMUEL LILLY, ISAAC S. LONG, HENRY H. LONGSTREET, HENRY MITCHELL, J. V. SCHENCK, GEO. R. SULLIVAN, G. W. TENEBREY, S. C. THORNTON, B. A. WATSON, J. ORLANDO WHITE, A. W. WOODHULL.

Burlington County Medical Society,	A. E. BUDD, FRANKLIN GAUNTT, GEO. GOODELL, R. H. PAGE, E. P. TOWNSEND.
Camden County Medical Society,	THOS. F. CULLEN, J. W. SNOWDEN.
Cumberland County Medical Society,	SAMUEL G. CATTELL, ROBT. W. ELMER.
Essex County Medical Society,	EDGAR HOLDEN, CHARLES J. KIPP.
Gloucester County Medical Society,	SAMUEL FISLER, JOHN R. SICKLER.
Hudson County Medical Society,	JOHN D. MCGILL.
Hudson County Pathological Society,	A. G. AVERY, ISAAC N. QUIMBY.
Hunterdon County Med. Society,	JOHN BLANE.
Monmouth County Med. Society,	T. J. THOMASON.
Passaic County Medical Society,	S. R. MERRILL.
St. Joseph's Hospital (Patterson),	E. J. MARSH.
Union County Medical Society,	F. A. KINCH, JAS. S. GREEN, ALONZO PETTIT.
Warren County Medical Society,	P. F. BRAKELEY.
Permanent Members,	J. S. CRANE, WM. ELMER.

NEW YORK.

State Medical Society,	C. R. AGNEW, NATHAN BOZEMAN, F. BURDICK, WM. GOVAN, JOS. C. HUTCHISON, ABRAHAM JACOBI, FERRIS JACOBS, HARVEY JEWETT, JAS. MOSHER, HENRY D. NOYES, LEWIS A. SAYRE, B. F. SHERMAN,

State Medical Society,	GOUVERNEUR M. SMITH, THOS. D. STRONG, L. I. TEFFT, S. O. VANDERPOEL, WILLIAM C. WEY, JAS. P. WHITE, HENRY B. WHITON.
Albany Hospital,	JAMES H. ARMSBY.
Albany Medical College,	JAMES MCNAUGHTON.
Bellevue Hospital Medical College,	WILLIAM T. LUSK, ISAAC E. TAYLOR,
Buffalo Medical College,	MILTON G. POTTER.
Chautauqua County Med. Society,	GEO. R. SPRATT.
Chenango County Medical Society,	S. F. MCFARLAND, B. F. SMITH.
Church Charity Foundation Hospital (Brooklyn),	JEROME WALKER.
Cortland County Medical Society,	CALEB GREEN, H. C. HENDRICK.
College of Physicians and Surgeons of Syracuse University,	ROGER W. PEASE.
East River Medical Association of the City of New York,	CHAS. A. HART.
Greene County Medical Society,	E. WHITTLESEY.
Kings County Medical Society,	SAMUEL G. ARMOR, GEO. M. BEARD, J. H. H. BURGE, ELIJAH W. CARPENTER, F. H. COLTON, A. B. CROSBY, W. C. OTTERSON, J. S. PROUT, WM. W. REESE, A. J. C. SKENE, GEO. K. SMITH, ED. R. SQUIBB, WM. HENRY THAYER.
Monroe County Medical Society,	EDW. M. MOORE, CHAS. S. STARR.
Mount Sinai Hospital (New York),	A. JACOBI, B. I. RAPHAEL.

New York Academy of Medicine,	GURDON BUCK, FRED. A. BURRELL, T. M. CHEESEMAN, THOMAS ADDIS EMMET, AUSTIN FLINT, ELISHA HARRIS, E. LEE JONES, E. KRACKOWIZER, CHAS. CARROLL LEE, J. C. MORTON, JAS. O. POND, A. C. POST, S. S. PURPLE, E. B. WARNER.
New York County Medical Society,	ROBERT A. BARRY, SALVATOR CARO, B. F. DAWSON, HENRY S. DOWNS, GHISLANI DURANT, H. P. FARNHAM, JOHN P. GARRISH, D. H. GOOLWILLIE, M. H. HENRY, MAX HERZOG, H. KNAPP, J. L. LITTLE, JOS. A. MONELL, R. J. O'SULLIVAN, ORRIN D. POMEROY, A. E. M. PURDY, ALEX. W. STEIN, JOHN WINSLOW, G. S. WINSTON, CHAS. S. WOOD, J. V. S. WOOLLEY.
New York Dermatological Society,	F. L. SATTERLEE, F. D. WEISSE.
New York Dispensary,	FRANK P. FOSTER.
New York Eye and Ear Infirmary,	A. H. BUCK.
New York Medical Library and Journal Association,	ED. SEGUIN.

New York Medico-Legal Society,	S. B. W. McLEOD.
New York Medical Union,	JAMES R. MACGREGOR, J. C. SMITH.
New York Obstetrical Society,	J. G. PERRY.
New York Pathological Society,	ROBERT NEWMAN.
North-Western Medical and Surgical Society (New York),	E. C. HARWOOD.
Oneida County Medical Society,	J. V. COBB, W. H. NELSON, H. N. PORTER.
Ontario County Medical Society,	J. B. HAYES, J. W. PALMER, J. T. SMITH.
Otsego County Medical Society,	GAIUS L. HALSEY.
Order of Æsculapius (New York),	G. W. WELLS.
Rensselaer County Medical Society,	DANIEL D. BUCKLIN, MATTHEW H. BURTON, GEORGE H. HUBBARD, J. C. HUTCHISON, J. T. LUCK.
Richmond County Medical Society,	W. C. ANDERSON.
Roman Medical Society (N. Y.),	W. JOHNSON.
Suffolk County Medical Society,	A. G. THOMPSON.
Sullivan County Medical Society,	W. L. APPLEY.
Tioga County Medical Society,	G. W. METCALFE, G. H. SCOTT.
Troy Hospital,	LE ROY MCLEAN.
Union Medical Association of Saratoga, Washington, and Warren Counties.	JAMES FERGUSON.
U. S. Marine Hospital (N. Y.),	HEBER SMITH.
Westchester County Medical Society,	J. F. CHAPMAN, G. J. FISHER.
Willard Asylum for Insane (Ovid),	J. B. CHAPIN.
Woman's Hospital (N. Y.),	J. MARION SIMS.
Yonkers Medical Association,	JOHN PARSONS.
Permanent Members,	R. B. BONTECOU, O. A. CARROLL, HIRAM CORLISS, H. W. DEAN, H. D. DIDAMA,

Permanent Members,	GEORGE DOUGLASS, WM. FRED. HOLCOMBE, N. C. HUSTED, R. R. MCILVAIN, W. B. NEFTEL.

NORTH CAROLINA.

State Medical Society,	W. A. B. NORCOM, C. J. O'HAGAN, J. F. SHAFFNER.
Permanent Member,	N. J. PITTMAN.

OHIO.

State Medical Society,	B. S. BROWN, WM. CARSON, JOHN CORSON, CHARLES W. DUNLAP, ALFRED FOLLETT, B. F. HART, B. B. LEONARD, JOHN A. LITTLE, J. R. WOODS.
Butler County Medical Society,	FLORILLO B. MORRIS.
Cincinnati Academy of Medicine,	A. E. HEIGHWAY, GEORGE MENDENHALL, THOMAS C. MINOR, M. L. NARDYZ, OLIVER D. NORTON, L. A. QUERNER, W. RASCHIG, J. P. WALKER, LEWIS S. WORTHINGTON.
Cincinnati Hospital,	C. G. COMEGYS.
Clark County Medical Society,	A. C. MCLAUGHLIN, H. SENSEMAN.
Erie County Medical Society,	A. H. RANKIN.
Fulton County Medical Society,	S. P. BISHOP.
Hardin County Medical Society,	A. W. MUNSON.
Knox County Medical Society,	FRANK C. LARIMORE, JOHN W. RUSSELL.
Montgomery County Med. Society,	THOS. L. NEAL.
Medical College of Ohio,	WM. H. GOBRECHT.

Miami Medical College,	WILLIAM H. MUSSEY.
Morgan County Medical Society,	PHILIP KENNEDY.
Muskingum County Med. Society,	H. CULBERTSON, CHARLES C. HILDRETH, J. G. F. HOLSTON, JR., J. D. JENNINGS, C. J. SKINNER.
North-Western Ohio Med. Society,	W. H. PHILIPS.
Stark County Medical Society,	R. P. JOHNSON.
Wayne County Medical Society,	W. S. BATTLES, J. D. ROBINSON.
Permanent Members,	W. T. BROWN, M. W. JUNKIN.

OREGON.

Med. Depart. Willamette Univer.,	THOMAS M. LOGAN.

PENNSYLVANIA.

State Medical Society,	E. P. ALLEN, D. MURRAY CHESTON, J. B. CRAWFORD, TRAILL GREEN, S. S. MEHARD, S. B. KEIFFER, S. L. KURTZ, S. G. LANE, W. H. MAGILL, EDWARD MILLS, D. A. ULRICH, W. W. WEBB.
Allegheny County Medical Society,	W. H. DALY, THOMAS J. GALLAHER, WM. M. HERRON, W. S. HUSELTON, WM. F. KNOX, D. LEASURE, NESBIT MCDONALD, F. LE MOYNE, ROBERT B. MOWRY, J. H. SNODGRASS, A. M. POLLOCK, E. A. WOOD.

Beaver County Medical Society,	B. FEICHT.
Berks County Medical Society,	J. COBLENTZ, L. DE B. KUHN.
Blair County Medical Society,	R. W. CHRISTY, J. M. GEMMILL, JR., G. W. SMITH.
Bradford County Medical Society,	GEO. F. HORTON, H. M. MOODY, D. N. NEWTON.
Bucks County Medical Society,	JOSEPH FOULKE.
Butler County Medical Society,	STEPHEN BREDIN.
Cambria County Medical Society,	SAMUEL M. SWAN.
Chester County Medical Society,	J. B. BRINTON, EPHRAIM HOPKINS. JACOB PRICE.
Clarion County Medical Society,	WM. M. CLOVER.
Columbia and Montour Counties Medical Society,	JOSEPH PRIESTLEY.
Crawford County Medical Society,	D. M. CALVIN, WM. VARIAN.
Cumberland County Med. Society,	E. B. BRANDT.
Dauphin County Medical Society,	S. MOORE FINLEY, R. H. SEILER.
State Lunatic Hosp.(Dauphin Co.),	JOHN CURWEN.
Delaware County Medical Society,	ISAAC N. KERLIN.
Fayette County Medical Society,	S. B. P. KNOX, J. S. VAN VOORHIS.
Franklin County Medical Society,	JOHN MONTGOMERY.
Huntingdon County Medical Society,	A. B. BRUMBAUGH, D. P. MILLER.
Lancaster County Hospital,	A. J. HERR.
Lancaster County Medical Society,	B. LEAMAN, JOHN K. LINEAWEAVER, WASHINGTON RIGHTER.
Lawrence County Medical Society,	J. H. M. PEEBLES.
Luzerne County Medical Society,	J. E. BULKELY, W. F. DENNIS, HORACE LADD.
Lycoming County Medical Society,	THOMAS A. HELLSBY, THOMAS LYON.
Mercer County Medical Society,	H. DE LA COSSETT, ELISHA GRISWOLD, S. M. ROSS.

Montgomery County Medical Society,	HIRAM CORSON, I. NEWTON EVANS.
Northampton County Med. Society,	JOHN SANDT.
Perry County Medical Society,	JOSEPH SWARTZ, J. E. SINGER.
Philadelphia County Medical Society,	D. HAYES AGNEW, L. S. BOLLES, ROBERT BURNS, J. SOLIS COHEN, A. H. FISH, ALBERT FRICKÉ, WILLIAM GOODELL, GEORGE HAMILTON, A. G. B. HINKLE, WILLIAM L. KNIGHT, HENRY LEAMAN, WILLIAM MAYBURRY, ANDREW NEBINGER, WILLIAM H. PANCOAST, HENRY H. SMITH, JOHN G. STETLER, WILLIAM M. WELCH.
Philadelphia, College of Physicians of,	JOHN ASHHURST, J. M. DA COSTA, R. J. DUNGLISON, HORACE Y. EVANS, A. DOUGLAS HALL, EDWARD HARTSHORNE, S. B. HOWELL, WILLIAM HUNT, F. F. MAURY, JOHN H. PACKARD, W. B. PAGE, B. HOWARD RAND, ISAAC RAY, THOMAS B. REED, W. S. W. RUSCHENBERGER, FRANCIS G. SMITH, JR., ALFRED STILLÉ, R. H. TOWNSEND, CASPAR WISTER, H. C. WOOD, JR.

Philadelphia, Catharine St. Disp.,	FRANK H. GETCHELL.
Philadelphia Charity Hospital,	H. ST. CLAIR ASH.
Philadelphia Children's Hospital,	H. LENOX HODGE.
Philadelphia Dispensary,	GEORGE STRAWBRIDGE.
Philadelphia Dispensary for Skin Diseases,	LOUIS A. DUHRING.
(*Philadelphia*) *Episcopal Hospital,*	WILLIAM S. FORBES, HERBERT NORRIS.
(*Philadelphia*) *Friends' Asylum for the Insane,*	JOSHUA H. WORTHINGTON.
Philadelphia Eye and Ear Infirmary,	JOHN W. MILLICK.
(*Philadelphia*) *German Hospital,*	JOSEPH F. KOERPER.
(*Philada.*) *Jefferson Med. College,*	SAMUEL D. GROSS.
(*Philada.*) *Jeff. Med. Coll. Hosp.,*	J. M. BARTON.
Philadelphia, Howard Hospital of,	DAVID BURPEE.
Philadelphia Hospital,	EDW. L. DUER, JOHN S. PARRY.
Philadelphia Hosp., Insane Dept.,	A. H. WITMER.
Philadelphia Hospital Medical Society,	R. G. CURTIN, GEORGE HALE, JR., E. W. JAMESON, W. H. PARRISH.
Pennsylvania Hospital,	A. HEWSON, JAS. AITKEN MEIGS.
Philadelphia Lying-in-Charity,	JOSHUA G. ALLEN.
Phila. Medico-Chirurgical Society,	S. B. W. MITCHELL, H. W. OZIAS, ALFRED G. REED.
Philada. Northern Dispensary,	CHARLES CARTER.
Northern Dispen., Med. Board of,	CHARLES K. MILLS.
Philada. Orthopædic Hospital,	H. E. GOODMAN.
Philadelphia, Northern Medical Association of,	LEVI CURTIS, L. J. DEAL, L. P. GEBHARD, NATHAN L. HATFIELD, F. W. LEWIS, J. H. SMALTZ.
Philadelphia, Obstetrical Society of,	LEWIS D. HARLOW, ROBERT P. HARRIS, W. F. JENKS, J. L. LUDLOW.

Philadelphia, Ophthalmological Society of,	E. DYER, T. G. MORTON.
Philadelphia, Pathological Society of,	S. ASHHURST, J. H. BRINTON, R. A. CLEEMANN, I. MINIS HAYS, JAS. H. HUTCHINSON, W. W. KEEN, SAMUEL LEWIS, J. E. MEARS, WILLIAM PEPPER, W. G. PORTER, JR., E. RICHARDSON, W. SINKLER, RALPH M. TOWNSEND, JAMES TYSON, JAMES C. WILSON.
Philadelphia, St. Joseph's Hospital,	CHARLES S. BOKER, W. V. KEATING.
Philadelphia, St. Mary's Hospital,	J. H. GROVE.
Philadelphia, Southern Medical Society of,	J. ENEU LAUGHLIN, J. T. WILLIAMS.
University of Pennsylvania,	JOSEPH LEIDY, ROBERT E. ROGERS.
Univer. of Pa., Auxiliary Faculty,	HARRISON ALLEN.
Wills Hospital, Philadelphia,	GEORGE C. HARLAN.
Schuylkill County Medical Society,	A. H. HALBERSTADT, D. HUNTER, B. F. SHANNON, J. F. TREICHLER.
Susquehanna County Med. Society,	W. L. RICHARDSON.
Williamsport Medical Society,	J. S. CRAWFORD, THOMAS LYON, GEORGE D. NUTT.
Venango County Medical Society,	L. H. CHRISTIE, T. W. EGBERT, W. S. WELSH.
Washington County Medical Society,	D. S. EAGLESON, JOS. H. LITTLE.
Westmoreland Co. Medical Society,	J. W. ANAWALT, D. W. MCCONAUGHY, J. M. STEVENSON.

Permanent Members,

WM. B. ATKINSON,
JOHN L. ATLEE,
WASHINGTON L. ATLEE,
G. W. BARR,
D. J. BRUNER,
S. W. BUTLER,
JAMES COLLINS,
WM. CORSON,
ALEX. CRAIG,
J. AUG. EHLER,
MANLY EMANUEL,
I. S. ESHELMAN,
WM. M. FINDLEY,
WM. R. FINDLEY,
EMIL FISCHER,
J. M. GEMMILL,
BUCKLAND GILLETT,
W. S. HALSEY,
HENRY HARTSHORNE,
THOMAS HAY,
JAMES W. KERR,
P. D. KEYSER,
C. PERCY LA ROCHE,
RENE LA ROCHE,
BENJAMIN LEE,
JAMES J. LEVICK,
J. H. B. MCCLELLAN,
JOHN R. MCCLURG,
J. MCCONAUGHY,
THOMAS A. MCREAN,
SIDNEY R. MORRIS,
JOS. G. RICHARDSON,
SCOTT STEWART,
J. D. STRAWBRIDGE,
W. T. TAYLOR,
S. K. TREICHLER,
SAMUEL N. TROTH,
LAURENCE TURNBULL,
EDWARD WALLACE,
JOHN J. ZITZER.

RHODE ISLAND.

State Medical Society,	OTIS BULLOCK, DANIEL M. EDWARDS, JOB KENYON.
Providence Medical Association,	F. H. PECKHAM.

SOUTH CAROLINA.

State Medical Society,	T. A. EVINS, ROBERT W. GIBBES, A. P. WYLIE.
Medical Society of South Carolina,	M. SIMONS.
Quarantine Hospital, Charleston,	ROBERT LEBBY.
South Carolina, Med. College of,	R. A. KINLOCH.
University of South Carolina,	A. N. TALLEY.

TENNESSEE.

State Medical Society,	WM. M. FINLEY, P. D. SIMS, JAS. F. WEED.
Davidson County Medical Society,	J. M. JAMISON.
Medical Department of the University of Nashville,	W. T. BRIGGS, T. B. BUCHANAN.
Montgomery County Med. Society,	W. T. MCREYNOLDS.

TEXAS.

Galveston Medical Society,	GREENSVILLE DOWELL.
Permanent Member,	THOMAS J. HEARD.

VIRGINIA.

State Medical Society,	FRED. HORNER, JR., J. H. WHITE.
Richmond Academy of Medicine,	J. B. COAKLEY, L. S. JOYNES, JOHN G. SKELTON, M. M. WALKER, J. SPOTTSWOOD WELLFORD.
Lynchburg Medical Society,	M. P. CHRISTIAN.
Virginia, Medical College of,	JAMES B. MCCAW, HUNTER MCGUIRE.

WEST VIRGINIA.

State Medical Society,	W. J. BATES, JR., W. J. BLAND, HUGH W. BROCK, J. E. KENDALL.
Wheeling, and Ohio County Medical Society,	R. H. CUMMINS, E. A. HILDRETH.
Permanent Member,	J. M. LAZZELL.

WISCONSIN.

State Medical Society,	JOHN K. BARTLETT, JOSEPH L. BRENTON, N. M. DODSON, CHRISTIAN LINDE, JAS. T. REEVE.
Racine County Medical Society,	PHILO ROMAYNE HOY.

UNITED STATES ARMY.

Medical Department U. S. Army,	B. FANEUIL CRAIG, J. J. WOODWARD.

UNITED STATES NAVY.

Medical Department U. S. Navy,	JOS. BEALE, GEO. CLYMER, RICHARD C. DEAN, JOHN C. SPEAR.

There being no objection to the confirmation of these delegates and permanent members, the President announced that the list thus reported by the Committee on Credentials was approved as read, and that the report was accepted.

Vice-President Dr. THOMAS M. LOGAN having taken the chair, the President then delivered the Annual Address.

Dr. HENRY F. ASKEW, of Delaware, offered the following:—

Resolved, That all questions of a personal character, including complaints and protests, and all questions on credentials, be referred at once, after the report of the Committee of Arrangements or other presentation, to the Committee on Ethics, and without discussion.

Dr. W. H. MUSSEY, of Ohio, asked that the resolution be divided, referring only questions of personal character to the Committee on Ethics.

Dr. ASKEW declined dividing the resolution.

Dr. MUSSEY asked if the question did not concern the rights of societies to be admitted to representation. He denied the right of the committee to decide upon such questions. He proposed, also, to refer the second branch of the subject to the Association.

The President said that such a course had never been pursued. Hitherto the Committee on Ethics reported to the Association on both subjects, their action being open to the approval of the Association.

Dr. HARTSHORNE said that the course of the Committee of Arrangements as a Committee on Credentials was plain and defined by law. It was simply to report for confirmation all credentials that could be verified as undoubted and uncontested; and to report, for reference, all others, together with the protesting or contesting papers filed against them. By admitting delegates and delegations to registration against whom there were objections, the committee would assume the very right of decision, at the expense and to the probable detriment of the Association—which is justly denied by Dr. MUSSEY, and which belongs, whether affirmatively or negatively, to the Association alone. The committee had determined to act upon this interpretation of the law, without fear or favor. It was their hope to avoid premature discussion; and thus to secure a fair hearing to all concerned, without any delay beyond what was unavoidable under the action of the meeting and of the Committee on Ethics, to which the questions in dispute were necessarily referred.

The proposed resolution was framed in accordance with this view. It could not be divided with propriety, because constituencies and representations cannot thus be separated. Under our organic law constituencies may be established by the admission of their representatives; and both, also, may fall together. No question can be more personal than the question of credentials, whether affecting individuals alone, or institutions alone, or both together. In either case the personal interests must be involved. Nor can the claims of delegates and constituents, as such, be considered separately or allowed to regulate each other.

Dr. J. MORRIS, of Maryland, called the previous question, which

having been sustained, Dr. ASKEW'S motion was put and carried without a dissenting voice.

The following gentlemen were appointed by the President as the Committee on Ethics:—

Drs. H. F. ASKEW, of Delaware; N. S. DAVIS, of Illinois; CALVIN SEAVY, of Maine; J. K. BARTLETT, of Wisconsin; and S. D. GROSS, of Pennsylvania.

The Permanent Secretary announced that Dr. COHEN would exhibit to the Surgical Section, this afternoon, a case of enormous cleft of hard and soft palate, expeditiously closed in a single operation, by a modification of LANGENBECK'S method; the operation having been performed in a sort of surgical duet by Dr. J. H. PACKARD and himself.

Dr. H. KNAPP, of New York, would offer before the same section some remarks on the extraction of cataract.

Dr. S. FITCH, of Maine, offered a paper entitled "Three Ovariotomists," which, on motion, was referred to the Section on Practice of Medicine and Obstetrics.

On motion, the Association adjourned until Wednesday, at 10 A.M.

SECOND DAY.

WEDNESDAY, MAY 8.

Vice-President Dr. T. M. LOGAN in the chair.

On motion, a recess was taken to permit each State and Territory represented to select a representative on the Committee on Nominations.

In consequence of the difficulty of hearing the motions, etc., in the hall, the Association reassembled in the First Reformed Presbyterian Church, on Broad Street, above Pine.

The President, Dr. YANDELL, in the chair.

The Permanent Secretary read the following as constituting the Committee on Nominations:—

W. O. BALDWIN, of Alabama; R. G. JENNINGS, of Arkansas; W. R. CLUNESS, of California; W. F. MCCLELLAND, of Colorado; S. W. TURNER, of Connecticut; ISAAC JUMP, of Delaware; SAMUEL C. BUSEY, of the District of Columbia; W. F. WESTMORELAND, of Georgia; W. A. KNOX, of Illinois; W. H. MYERS, of Indiana; W. F. PECK, of Iowa; L. ROGERS, of Kentucky; S. FITCH, of Maine; J. MORRIS, of Maryland; H. I. BOWDITCH, of Massachusetts;

C. M. STOCKWELL, of Michigan; ALEX. J. STONE, of Minnesota; EDW. MONTGOMERY, of Missouri; B. A. VAUGHAN, of Mississippi; J. C. TUCKER, of Nevada; J. H. WHEELER, of New Hampshire; T. J. THOMASON, of New Jersey; WM. C. WEY, of New York; C. G. COMEGYS, of Ohio; THOMAS M. LOGAN, of Oregon; R. E. ROGERS, of Pennsylvania; F. H. PECKHAM, of Rhode Island; R. A. KINLOCH, of South Carolina; W. M. FINLEY, of Tennessee; G. DOWELL, of Texas; JAS. B. MCCAW, of Virginia; R. H. CUMMINS, of West Virginia; J. T. REEVE, of Wisconsin; J. J. WOODWARD, of the U. S. Army; G. CLYMER, of the U. S. Navy.

The Committee on Nominations were requested to meet at once in Horticultural Hall.

On motion of Dr. R. E. ROGERS, of Pennsylvania, the following were elected members by invitation: Drs. J. EDGAR CHANCELLOR, of Virginia; M. J. ASH, of the U. S. Army; W. W. VINNEDGE, of Indiana; H. C. BICKFORD, of Massachusetts; A. H. SHAFFER, of Indiana; G. W. HERRICK, of Massachusetts; and DAVID D. MABON, of Pennsylvania.

Dr. J. R. BRONSON, of Massachusetts, offered the following:—

Resolved, That the Committee on Ethics, to consist of seven members, shall be nominated by the Committee on Nominations.

The President decided that, as it was now impracticable, and was virtually an amendment of the constitution, this proposition must lie over till next year.

Dr. BRONSON then offered it as a resolution, to apply to the next annual meeting. After some discussion, and an appeal from the decision of the Chair, this decision having been sustained by a large majority of the Association, the motion was again put and lost by a vote of 167 ayes to 187 nays.

Dr. W. C. VAN BIBBER, of Maryland, having asked the appointment of a special committee to examine and report upon an unknown remedy which he exhibited, the subject was referred to the Section on Materia Medica and Chemistry.

Dr. N. S. DAVIS, of Illinois, offered a preamble and resolutions touching the action of the Massachusetts Medical Society, which, on motion of Dr. E. L. HOWARD, of Maryland, were referred to the Committee on Ethics.

Dr. E. SEGUIN, of New York, offered some remarks on Clinical Thermometry. On motion, he was requested to bring the subject before the Section on Practice of Medicine and Obstetrics.

The reports of the Committee of Publication and of the Trea-

surer, the latter showing a balance in the treasury of $1005, were then read, and referred to the Committee of Publication.

Dr. J. S. WEATHERLY, of Alabama, chairman of the Committee on Medical Education, read his report; which, on motion, was referred to the Committee of Publication.

The Librarian, Dr. F. A. ASHFORD, of the District of Columbia, read his report; which, on motion, was referred to the Committee of Publication.

In the absence of Dr. ALFRED STILLÉ, of Pennsylvania, chairman of the Committee on Prize Essays, in consequence of a death in his family, Dr. F. G. SMITH, of Pennsylvania, reported that said committee had awarded but one prize. This was to an essay bearing the motto, "*Ne tentes aut perfice*," and entitled, "What Physiological Value has Phosphorus as an Organismal Element?"

On breaking the seal, he announced Dr. SAMUEL R. PERCY, of New York, as the successful essayist.

On motion, the report and essay were referred to the Committee of Publication.

Dr. THEOPHILUS PARVIN, of Indiana, chairman of the Committee on Medical Literature, read his report; which, on motion, was referred to the Committee of Publication.

Dr. J. D. JACKSON, of Kentucky, chairman of the Committee on American Medical Necrology, presented his report; which, on motion, was referred to the Committee of Publication.

The Permanent Secretary announced that Dr. J. G. RICHARDSON, of Pennsylvania, would read his report, On the Structure of the White Blood Corpuscles, before the Section on Hygiene, Physiology, etc.

A paper, by Dr. HENRY HARTSHORNE, of Pennsylvania, on the Physiology of the Vaso-motor Nerves, was presented, and referred to the same Section.

The Secretary also announced that Dr. JOHN H. PACKARD, of Pennsylvania, would exhibit to the Section on Surgery and Anatomy, a Suspension Apparatus for Fracture of the Leg, and a Bracketed Splint for Excisions of the Knee and for Compound Fractures.

Dr. E. M. HUNT, of New Jersey, reported progress on the Climatology and Epidemics of that State.

Dr. GEO. M. BEARD, of New York, offered a paper on "Recent Researches in Electro-Therapeutics, with Demonstrations of Some

of the Methods of Application." On motion, it was referred to the Section on Practice of Medicine and Obstetrics.

Dr. J. P. GARRISH, of New York, offered a paper on "The Use of Instruments in Obstetrics," which was similarly referred.

Dr. S. B. MERKEL proposed to bring before the Association George Thomas, a native of Brazil, who, although externally well formed, can move his heart about at will; and can also whirl the abdomen like a huge ball, with an undulating motion, around the umbilicus.

On motion, the case was referred to the same Section.

Dr. W. H. MUSSEY, of Ohio, offered a paper on Electrolysis in Cancer, and one entitled "A Case of Vesical Calculus and Polypi of the Prostate Gland." Illustrated with photographs and specimens.

On motion, both were referred to the Section on Surgery and Anatomy.

A paper on the Soft Palate in Health and Disease, by Dr. HARRISON ALLEN, of Pennsylvania; one on Operation of the Hip-Joint, with a detailed case, by Dr. W. F. PECK, of Iowa, and one entitled "Four Cases of Fracture of the Femur," by Dr. P. R. HOY, of Wisconsin, were offered, and similarly referred.

Dr. P. PINEO, of Massachusetts, presented the Report of the U. S. Marine Hospital Service, which, on motion, was referred to the Section on Practice of Medicine and Obstetrics.

Several disputed credentials, and other papers, having been reported by the Committee of Arrangements, were referred, without comment, to the Committee on Ethics.

Dr. GEO. SUTTON, of Indiana, chairman of the Committee on the Comparative Pathology and the Effects which Diseases of Inferior Animals have upon the Human System, reported, and the committee was continued.

On motion of Dr. A. M. POLLOCK, of Pennsylvania, it was

Resolved, That a committee of seven be appointed by the President to take into consideration the propriety of adopting the suggestions of the Committee on Medical Education.

Committee.—Drs. A. M. POLLOCK, of Pennsylvania; W. F. WESTMORELAND, of Georgia; A. N. TALLEY, of South Carolina; J. WALKER, of New York; J. D. JACKSON, of Kentucky; J. S. WEATHERLY, of Alabama, and H. MAGUIRE, of Virginia.

Dr. J. M. KELLER, of Kentucky, offered the following:—

Resolved, That the Committee on Publication have discretionary

power on all papers referred to them, unless instructions to publish accompany the papers when referred.

Dr. J. G. STETLER, of Pennsylvania, offered the following:—

Resolved, By the American Medical Association, that no report, paper, etc., referred by it to the various Sections, shall be referred by the latter to the Committee of Publication without first having been examined and approved by two-thirds of the members present at said Section.

Dr. F. G. SMITH, of Pennsylvania, asked if these were not amendments to the constitution, and consequently should lie over?

A motion by Dr. P. C. WILLIAMS, of Maryland, to lay both on the table, was lost—ayes 104, nays 165.

Dr. S. C. GORDON, of Maine, offered as a substitute,

Resolved, That the Committee of Publication have discretionary power as to publishing all papers referred to them by the Society or Sections.

Dr. A. B. PALMER, of Michigan, moved the indefinite postponement of the whole matter.

The President having decided that debate was not in order on such a motion, Dr. J. G. STETLER, of Pennsylvania, appealed from his decision; the question was put, and the Chair sustained.

The indefinite postponement was then agreed to by a large majority.

On motion, the Association adjourned, to meet on Thursday at 10 A.M.

THIRD DAY.

THURSDAY, MAY 9.

The President called the Association to order at 10 A.M.

On motion, Drs. E. N. ASH, of North Carolina, S. TROUPE MAXWELL, of Florida, and JOHN BERRYMAN, of New Brunswick, were elected members by invitation.

The Permanent Secretary read the following communication:—

HALL OF THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA, May 1, 1872.

W. B. ATKINSON, M.D.,

Permanent Secretary American Medical Association:—

DEAR SIR: At a stated meeting of the college, held this evening, the following preamble and resolutions were passed:—

"*Whereas*, Cases of accidental poisoning, and of the internal ad-

ministration of medicines intended only for external use, are so frequent, and whereas every possible safeguard should be employed to prevent such accidents; therefore,

"*Resolved*, That it is recommended to all druggists to place all external remedies in bottles not only colored, so as to appeal to the eye, but also rough upon one side, so that by the sense of touch no mistake shall be possible even in the dark.

"*Resolved*, That all bottles containing poisons should not only be labeled 'poison,' but also with another label indicating the most efficient and convenient antidote.

"*Resolved*, That a copy of these resolutions be presented to the American Medical Association, the College of Pharmacy of Philadelphia, and the American Pharmaceutical Association, and their assistance asked in bringing about so desirable a reform."

Respectfully yours,

JOHN H. PACKARD,
Secretary, College of Physicians of Philadelphia.

On motion of Dr. L. A. SAYRE, of New York, these resolutions were unanimously adopted.

Dr. ALEX. W. STEIN, of New York, offered the following, which was adopted:—

Whereas, It has long since been recognized that diseases of a dangerous and fatal nature are transmissible from animals to man, and that certain zymotic affections which are common to both man and animals, do very frequently manifest themselves first in the latter and subsequently in man, thus warning us that to be indifferent to the condition of the inferior animals is to introduce and create centres of disease among ourselves;

Resolved, That a committee be appointed to ascertain what measures can be instituted to prevent the extension of such diseases to man, and what sanitary measures can be effected to arrest the progress of such diseases in animals.

The President appointed as the committee, Drs. A. W. STEIN, of New York, GEO. SUTTON, of Indiana, and S. D. GROSS, of Pennsylvania.

Dr. J. M. KELLER, of Kentucky, presented a circular, which was at once referred to the Committee on Ethics.

Dr. FREDERICK HORNER, JR., of Virginia, offered the following, which was adopted:—

Whereas, the abuse of ardent spirits in our country has proved injurious to the health of the community,

Resolved, That the members of this Association do recommend to our medical brethren to discourage the abuse of alcoholic stimuli in their several communities.

Dr. FRANCIS G. SMITH, of Pennsylvania, chairman of the Committee on a Nomenclature of Diseases, reported as follows:—

In accordance with instructions given to them by the Association in 1870, the committee have prepared a Nomenclature of Diseases, to be recommended to the medical practitioners of the United States for adoption and observance. It will be remembered that the committee appointed at New Orleans in 1869, to determine what alterations, if any, are necessary, to adapt the Provisional Nomenclature of the Royal College of Physicians of London to general use in the United States, reported at Washington, that the English Nomenclature was not adapted to this end, and recommended the appointment of a new committee to prepare a Nomenclature of their own. This committee are now prepared to submit the results of their labors. The system of Nomenclature offered is based upon that of the Royal College of Physicians of London, with such additions and modifications as in the judgment of the committee were needed. The general divisions of that work have been adopted, although the order of their succession has been materially modified, and the whole is preceded by a general nomenclature of morbid conditions, such as do not constitute special diseases. It must be remembered that the Nomenclature adopted by the Royal College is *strictly* provisional, and that provision was made for its modification, as necessity might demand. It was expressly set forth, not as possessing absolute scientific accuracy, but as a contrivance for securing the use of the same name for the same disease, and "for perfecting the statistical registration of diseases, with a view to the discovery of the laws which determine their causes, phenomena, and results." The same may be said of that which your committee present; it also is provisional, and must be subject to such alteration and revision as experience may prove desirable.

In selecting Latin equivalents for English names of diseases, the committee have frequently departed from the example of the English Nomenclature, in which, as far as possible, Latin terms of classical authority have been employed. Their reasons for doing so are briefly these:—

1. A large number of diseases now commonly recognized were totally unknown to the ancients.

2. The language of medicine, like that of law, abounds in technical Latin terms of mediæval or later origin, and these are the only terms by which the things signified by them are generally known.

3. To express the ideas of modern science in classical Latin often involves the use of periphrases which tend to obscure, instead of making them clearer.

In the Nomenclature of the Royal College of Physicians of London, precedence is given to the Latin over the English names. Your committee have reversed this arrangement, believing that wherever English names exist, they should be preferred, because they are more intelligible to the greater number of practitioners, and because the tendency is everywhere increasing to use vernacular idioms in naming diseases. Latin synonyms for them are, however, annexed, which have a definite meaning for the medical profession in all civilized nations.

The committee have been engaged for two years in the preparation of its Report, and have held nearly fifty meetings. Whatever defects, therefore, it may present, cannot, they think, be laid to a want of industry or care.

They have to deplore, with many others, the loss by death of a valued member of their body, Dr. SAMUEL HENRY DICKSON, who, by his extensive learning, wide experience, and cultivated intellect, gave great aid to their labors; and, although his failing health prevented his being a constant attendant on the meetings of the committee, his sympathies were always with its work, and his counsel was promptly and cheerfully given. In common with this community in which he lived, and with this Association, we mourn his loss.

In order to expedite and facilitate the work devolving upon them, the committee was early divided into sub-committees of Practical Medicine, Surgery, and Obstetrics, to each of which was assigned the study of a special department, the results of which were reported to the general committee for approval. By invitation of the general committee, Dr. J. ASHHURST, JR., was added to the sub-committee on Surgery, and Dr. W. GOODELL to that on Obstetrics. To each of these gentlemen, the committee desire to express their thanks for the valuable assistance which they rendered. In concluding this brief report of their labors, the fruits of which are seen in the printed matter now presented to the

Association, the committee respectfully offer the following resolutions:—

Resolved, That the Report of the Committee on the Nomenclature of Diseases be referred to a special committee of five members, to be appointed by the President, who shall examine it, and report upon its final disposition, at the present meeting of the Association.

Resolved, That on the favorable report of such committee it shall be referred back to the Committee on the Nomenclature of Diseases, for the preparation of an Index to be published with it in the forthcoming volume of the Transactions.

FRANCIS G. SMITH, JR., *Chairman.*
GEO. B. WOOD, of Philadelphia.
ALFRED STILLÉ, of Philadelphia.
W. S. W. RUSCHENBERGER, of U. S. Navy.
J. ASHHURST, JR., of Philadelphia.
WM. GOODELL, of Philadelphia.
T. PARVIN, of Indiana.
R. F. MICHEL, of Alabama.
WM. M. McPHEETERS, of Missouri.
L. P. YANDELL, of Kentucky.

Dr. J. J. WOODWARD, of the U. S. Army, offered a minority report, as follows:—

A minority of the Committee on Nomenclature have the honor to report:—

That while they entertain the highest respect for the abilities and learning of those members of the committee whose residence in Philadelphia has enabled them to attend its meetings and aid in the production of the report which has just been submitted, they nevertheless feel it a duty to express their earnest conviction that the adoption of a Nomenclature and Classification by this Association is a matter of too great importance to be acted upon hastily, before the members have had any opportunity to examine for themselves the Nomenclature and Classification proposed.

The minority of the committee have had no opportunity to examine the proof-sheets of the work until since the commencement of the present meeting of the Association, and the time since then has been far too short for them to form an opinion as to details. They do not, therefore, wish to be understood as criticising the work done in any way, but simply ask, as a measure of justice and wisdom, that it may be submitted to the judgment of the profession before it is acted upon by this body.

They have the honor, therefore, to offer the following resolution as a substitute for the resolution offered by the majority.

Resolved, That the Nomenclature and Classification just submitted by the committee be published in the Transactions; that one thousand extra copies be printed in pamphlet form and distributed to the profession, and that the question of the adoption of the proposed Nomenclature and Classification by this body be postponed till the next annual meeting.

Signed, A. B. PALMER, of Michigan.
J. J. WOODWARD, of U. S. Army.
GEO. A. OTIS, of U. S. Army.
AUSTIN FLINT, of New York.

On motion of Dr. A. B. PALMER, of Michigan, both reports were accepted.

The reports were discussed by Drs. WOODWARD; F. G. SMITH, Pa.; G. HAMILTON, Pa.; J. P. WHITE, N. Y.; E. L. HOWARD, Md.; T. J. GALLAHER, Pa.; W. G. H. NEWMAN, D. C.; A. B. PALMER, Mich.; W. L. ATLEE, Pa.; and E. R. SQUIBB, N. Y.

The resolution attached to the report of the minority was then adopted.

Dr. J. M. KELLER, of Kentucky, offered the following, which was not adopted:—

Resolved, That so much of the report of the Committee on Medical Education as referred to the establishing of a Medical Congress, consisting of an equal number of representatives from each State, is of immediate importance, and in order to a furtherance of the views expressed, that a committee of one from each State be appointed at once, to take the preliminary steps necessary to organization, with instructions to report before adjournment of the present session.

Dr. W. O. BALDWIN, from the Committee on Nominations, read a partial report, as follows:—

PRESIDENT.

Dr. THOMAS M. LOGAN, *of California.*

VICE-PRESIDENTS.

1. Dr. B. H. CATLIN, *of Connecticut.*
2. Dr. W. M. MCPHEETERS, *of Missouri.*
3. Dr. A. M. POLLOCK, *of Pennsylvania.*
4. Dr. W. T. BRIGGS, *of Tennessee.*

TREASURER.

Dr. CASPAR WISTER, *of Pennsylvania.*

LIBRARIAN.

Dr. WILLIAM LEE, *of District of Columbia.*

COMMITTEE ON LIBRARY.

Dr. J. M. TONER, *of District of Columbia.*

ASSISTANT SECRETARY.

Dr. M. A. PALLEN, *of Missouri.*

Next place of meeting—St. Louis.

On motion, the report was unanimously adopted.

Dr. M. A. PALLEN, of Missouri, thanked the Association for having thus handsomely agreed to meet next year in St. Louis. He presented, on behalf of Dr. S. GRATZ MOSES, of St. Louis, who was absent, the following plan to elevate the standard of medical men:—

Whereas, The vast extent and increasing population of this great country, creates an increased demand for medical men, numerous medical schools have sprung up in every direction, nearly all of which have the power of granting diplomas to the graduates, and that a diploma is simply a certificate, that its recipient has passed an examination satisfactory to the faculty of said schools; therefore, it behooves the medical profession to grant a higher award of merit to such of its members who may be distinguished by high medical attainments, and great moral worth: Therefore, be it

Resolved, That the American Medical Association take means to establish a National Academy of Medicine.

Resolved, That the object of the Academy of Medicine shall be to elevate the standard of medical attainments and moral worth of the medical profession, so that a certificate of membership of the Academy shall be the highest evidence and mark of distinction of a learned and honorable physician.

Resolved, To accomplish these objects, that a board or boards of examiners, without salary, and irrespective of medical schools, shall be yearly appointed by the National Academy, whose duty it shall be to examine carefully and conscientiously each applicant for membership.

Resolved, That the board or boards shall report those who have passed a satisfactory examination to the National Academy of Medicine, at their yearly session, who shall proceed to ballot for the candidates.

Resolved, That to all those who shall be elected, a certificate of membership shall be granted, which certificate shall be signed by the President and Secretary of the Academy of Medicine.

Resolved, That the cost of said certificate shall be

Resolved, That the amount accruing from the above source shall compose a fund, to be properly invested and held in trust for the benefit of the needy widows and orphans of deceased members of the National Academy of Medicine.

Dr. PALLEN then moved that a committee of seven be appointed by the President, to carry out the object of these resolutions, and that their author, Dr. S. GRATZ MOSES, of St. Louis, be chairman.

This motion was lost, and no further action was taken on the subject.

Dr. S. TROUPE MAXWELL, of Florida, presented a Laryngoscope, which was, on motion, referred to the Section on Surgery and Anatomy.

Dr. T. M. LOGAN, of California, chairman of the Committee on a National Health Council, presented the following report, and asked to be continued, to constitute a special Section on State Medicine.

The chairman of the Committee on a National Health Council, in conformity with certain resolutions adopted at the last meeting of the Association, respectfully reports:—

That the initiative was taken by first transmitting a circular to each of the thirty members of the committee, representing as many States, informing them of their appointment and of its nature. Upon the receipt of a favorable response from most of the committee, a form of a memorial was prepared, printed, and mailed to each, with a view of bringing about a concerted movement in every State in regard to such legislative action as the subject seemed to require.

While your committee are not yet able to give any definite results of their action, still we report progress, and can confidently state that, although the requisite number of States have not yet conformed to the resolutions we were appointed to carry out, nevertheless, a general interest has been awakened throughout the length and breadth of our common country, in the great questions therein involved. To no better evidence in proof of this assertion

can we point than to the recent message of the Governor of this great State wherein we are now assembled—the "Keystone" in the sublime arch, crowning the unity alike of our Republic and of American Medicine. In the broad, statesmanlike views therein enunciated, the immense power for good is clearly recognized, which resides in the State, and which can only be exercised by the State in promoting those healthful influences and bringing into play all those forces of sanatory science which are capable of counteracting the evils which civilization brings in its train. For while private enterprise is hastening after the acquisition of wealth, and applying all the resources of science in its production, so also should recourse be had to science by the State for protection against the evils which the hurtful, because selfish, spirit of enterprise is continually engendering. And so clearly defined are now the methods by which these conditions can be fulfilled, that we may safely measure the real rank which a State holds in the scale of civilization by the attention it bestows on public hygiene.

It would be out of place, neither is it conceived necessary, for your committee at this time to reënforce the enlightened representatives of our profession here assembled, with reasons beyond those with which they are all already familiar, for more active endeavors in the sanative field of science. The facts and deductions that from year to year have been so ably and so clearly pressed upon your attention by means of the able reports on medical topography and vital statistics recorded in our Transactions, point unmistakably to the close relationship between rational medicine and sanitary science. They illustrate, either by figures or facts, the sad ravages from premature death upon whole communities by preventable diseases—the result of non-conformity to the laws of hygiene. They show that the diseases bred of malaria are rife among us. They point to the pallid, tuberculous artisans of our overgrown cities; to their slaughtered infants; and to the unhappy, fallen women, and the demons of debauchery who meet us at every turn.

Now, no amount of individual effort or of medical skill can do what is wanted in the premises. Earnest, combined action, not only in but out of the profession also, is what is wanted to secure to the great masses of the people the first conditions of a sound sanitary state; to arrest the propagation of infectious disorders; to prevent overcrowding in dwelling-houses, and overtasking in schools and manufactories; to furnish an adequate supply of fresh

air and potable water, and otherwise to provide against the new dangers to health and to life which the progress of population, consequent upon the increase of wealth, are continually introducing. Without extrinsic aid, however, it is believed that we can effect comparatively but little. The influence and moral power even of medical men are limited, and it is in fact impossible for those in large practice, with all the anxieties which such practice necessarily entails, to give to questions of a public nature the time and consideration their importance demands. What seems to be required, therefore, to meet the necessities of the case is a thoroughly well-organized department of health, connected with government, under the surveillance of this Association, and charged with the duty of superintending a sanatory system, to which our municipal and State boards of health shall be subsidiary, just as our county and State societies are to this organization.

Through the instrumentality of such State boards of health as now inaugurated in Massachusetts, California, Minnesota, and Virginia, a body of medical men will be provided for, who will thus be enabled to withdraw from the engrossing demands of private practice and to devote themselves to the special study of sanitary questions; and in order to secure a constant supply of competent physicians to this end, there should be instituted in our medical schools, full and complete courses of instruction in State Medicine.

As the phrase "State Medicine" is perhaps imperfectly understood by many of the profession, and is absolutely new to the general public, we would here, parenthetically, to give an idea of what it is, quote the list of subjects which have been suggested as properly appertaining to it by a committee of the General Medical Council of Great Britain. They are: Forensic Medicine, Toxicology, Morbid Anatomy, Psychological Medicine, Laws of Evidence, Preventive Medicine, Vital and Sanitary Statistics, Medical Topography and certain portions of Engineering Science and Practice. In short, as a member of the committee well expresses it, State Medicine consists in the application of medical knowledge and skill to the benefit of communities, which is obviously a very different thing from their application to the benefit of individuals in private or curative medicine.

The course of lectures to which we have just referred might be open for the instruction of the public generally, and particularly school teachers, trained nurses, and sanitary inspectors. This proposition can the more easily be acted upon because our knowl-

edge of the whole subject is now not only sufficiently advanced and possessed of scientific accuracy, but is also of a character that lends itself with peculiar facility to popular exposition. One great difficulty which officers of health experience everywhere is, that they rarely obtain official information of epidemic disease, even in their own districts, until they see deaths registered against it, when it is obviously too late to adopt measures for prevention. Now, if the intelligent co-operation of the laity was secured, not only would the obstructive effects of present ignorance and apathy, to a great extent, be got over, but, by wise and active combination, we would be enabled to crush out, in their very incipiency, those fearful infections which become almost uncontrollable if not checked in their very onset. There is no longer any doubt that, whatever may be the vagueness of our conjectures or the strife of our controversies respecting the real nature of contagion, of air poisons or of marsh miasm—be they organic germs, capable of indefinite multiplication or proliferation, when once imbedded in an appropriate nidus; or be they new combinations of proximate principles generated out of death, decay, and disintegration—sanitary science has, either by making their habitats untenantable and incapable of maintaining their noxious life, or by chemically decomposing them as morbific matter, in many instances disarmed them of their terrors.

Typhoid fever offers, perhaps, the most striking illustration of this position. Not only is the law of its propagation perfectly understood, but the excreta by which almost exclusively its deadly germs are sown throughout society, are, on their issue from the body, entirely within our control. To disinfect these excreta has been found almost infallibly to prevent the fever from spreading. The same may be said in regard to Asiatic cholera. The subtle and volatile poison of scarlatina is disarmed of its virulence, by guarding against its desquamative scales during convalescence. The limitation of diphtheria, by precautions of a similar nature, in well-ordered households at any rate, is a matter of the greatest uncertainty.

Diffuse the discovery of the means of protection against these and many other diseases which has been perfected under the vigilant outlook and investigation of combined chemical and microscopic detectives; extend what has been successfully applied to circumscribed communities to States and to nations; let facilities for concerted action be established internationally through the

instrumentality of governments; and the people will no more be decimated by those pandemic waves which have so often swept with cumulative impetuosity over the face of the earth. Utopian as the idea may at first sight appear of stamping out the great anti-sanitary evils which beget disease, still it would be taking a very limited view of the power of the human mind, and argue a strange obliquity of vision as to the lessons its triumphs in other fields are every day teaching us, to doubt our ultimate ability to do so. "That man, who is rapidly subduing all the most Titanic forces of the Universe to his commonest uses, should always remain at the mercy of these ignoble things, is an antithesis too extreme to be permanent."[1] The Government of the United States has already done something in the direction toward which these suggestions tend, by the establishment of a Bureau connected with the War Department, which makes constant synopses of the weather, storm-currents, and other meteorological phenomena occurring in some of the most prominent parts of the Union. Let the operations of the "Signal Service" be so extended as to reach the remotest expansions of the Republic; and while there shall be sent from the capital of every State and Territory full telegrams of the daily travail of nature in all her parts to the federal head, let the respondent wire report back simultaneously everything of scientific interest to the physician as well as the physicist.

The important results that will follow when this labor of devotion to science shall be taken up and carried out from America to Europe, and the two continents made to exchange their daily records of disease and weather reciprocally, may be imagined, but cannot be conceived in their illimitable applications. Not only will storm-currents be indicated hours, if not days, in advance of their actual presence, but all the meteoric and other phenomena attendant upon the appearance of diseases will be noted and heralded, so that the progress of the latter may be combated in their small beginnings, before they gain a foothold in the land; and thus, while from the concomitant observations of an expanded horizon the origin and advance of epidemics will be made more apparent than they now are, so will their latent relationship to some great cosmic or telluric laws be probably discovered.

It is peculiarly fitting for us, who glory in the fame of our

[1] Dr. William Budd, of England, many of whose forcible thoughts have been adopted in this report.

Franklin and our Morse; it is due to our own share, as Americans, in that fame, and to our own interests in the great results to the world of their grand inventions, that we should be the first to establish such systems of intercommunication as they have rendered practicable among ourselves and among the nations of the world, as will lead to a strictly correlative achievement in putting the plagues of nature under our feet, by the subjection we possess of the powers of nature to our will.

In conclusion your committee respectfully ask to be continued, and to constitute a special Section on "State Medicine and Public Hygiene," to which all subjects cognate thereto may be referred.

On motion, the report was accepted.

Dr. J. C. TUCKER, of California, offered as a substitute for the concluding proposition, a resolution, asking Congress to establish a National Sanitary Bureau; and presented an act bearing on this subject.

On motion of Dr. T. J. GALLAHER, of Pennsylvania, this resolution was laid on the table.

Dr. R. A. KINLOCH, of South Carolina, offered an amendment to the request attached to Dr. LOGAN'S report, striking out the appeal to the Government, which was accepted by Dr. LOGAN, and the committee was continued in accordance with the request of the chairman.

The Committee on Nominations presented their additional report:

Committee of Arrangements.—Drs. JOHN B. JOHNSON, JOHN T. HODGEN, JOHN S. MOORE, P. GERVAIS ROBINSON, THOMAS KENNARD, J. M. LEETE, F. V. L. BROKAW, J. M. SCOTT, all of St. Louis.

Committee of Publication.—Drs. F. G. SMITH, of Pennsylvania, Chairman; WM. B. ATKINSON, of Pennsylvania; D. MURRAY CHESTON, of Pennsylvania; WILLIAM LEE, of District of Columbia; CASPAR WISTER, of Pennsylvania; H. F. ASKEW, of Delaware; J. AITKEN MEIGS, of Pennsylvania.

Committee on Prize Essays.—Drs. JOHN S. MOORE, of Missouri, Chairman; E. H. GREGORY, of Missouri; N. S. DAVIS, of Illinois; THEOPHILUS PARVIN, of Indiana; G. W. MENDENHALL, of Ohio.

Committee on Medical Education.—Drs. WILLIAM CARSON, of Ohio, Chairman; JOSEPH P. LOGAN, of Georgia; E. LLOYD HOWARD, of Maryland; H. K. STEELE, of Colorado; S. OAKLEY VANDERPOEL, of New York.

Committee on Medical Literature.—Drs. AUSTIN FLINT, of New York, Chairman; L. P. YANDELL, SR., of Kentucky; W. HENDER-

SON, of Alabama; S. B. THRALL, of Iowa; CALVIN SEAVY, of Maine.

Committee on Medical Necrology.—Drs. J. D. JACKSON, of Kentucky, Chairman; CHARLES W. PARSONS, of Rhode Island; E. A. HILDRETH, of West Virginia; W. W. JOHNSON, of District of Columbia; G. L. SIMMONS, of California; W. C. WARRINER, of Oregon; E. B. STEVENS, of Ohio; D. HAYES AGNEW, of Pennsylvania; D. W. STORMONT, of Kansas; J. B. JOHNSON, of Missouri; H. R. STORER, of Massachusetts; W. S. W. RUSCHENBERGER, of U. S. Navy; E. H. HAZEN, of Iowa; LEVI G. HILL, of New Hampshire; A. SAGER, of Michigan; V. KERSEY, of Indiana; A. E. AMES, of Minnesota; W. H. WILLIAMS, of Colorado; J. O. HAMILTON, of Illinois; J. H. PEABODY, of Nebraska; L. P. BUSH, of Delaware; G. W. RUSSELL, of Connecticut; SAMUEL C. CHEW, of Maryland; S. H. STOUT, of Georgia; T. J. HEARD, of Texas; A. H. SCOTT, of Arkansas; WILLIAM H. BAILEY, of New York; B. R. JONES, of Alabama; D. McRUER, of Maine; A. N. TALLEY, of South Carolina; JOHN BLANE, of N. Jersey; J. W. M. SHATTUCK, of Mississippi; LEVIN S. JOYNES, of Virginia.

OFFICERS OF SECTIONS.

Chemistry and Materia Medica.—Drs. R. E. ROGERS, of Philadelphia, Pennsylvania, Chairman; EPHRAIM CUTTER, of Boston, Massachusetts, Secretary.

Practice of Medicine and Obstetrics.—Drs. D. A. O'DONNELL, of Baltimore, Maryland, Chairman; BENJAMIN F. DAWSON, of New York, Secretary.

Surgery and Anatomy.—Drs. EDWARD WARREN, of Baltimore, Md., Chairman; W. F. PECK, of Davenport, Iowa, Secretary.

Meteorology and Epidemics.—Drs. GEORGE SUTTON, of Aurora, Indiana, Chairman; ELISHA HARRIS, of New York, Secretary.

Medical Jurisprudence, Hygiene, and Physiology.—Drs. S. C. BUSEY, of Washington, D. C., Chairman; A. B. ARNOLD, of Baltimore, Md., Secretary.

Psychology.—Drs. ISAAC RAY, of Philadelphia, Pa., Chairman; JOHN CURWEN, of Harrisburg, Pa., Secretary.

Several resolutions relative to the publication of papers in the Transactions, and instructing the Committee of Publication, were offered; but after discussion, on motion of Dr. N. S. DAVIS, of Illinois, the whole matter was indefinitely postponed.

The Committee on Ethics reported through Dr. N. S. DAVIS, as follows:—

Your committee have made a careful and patient examination of each and every subject referred to them by the Association. In all cases involving the rights of individuals or organized institutions to representation, the individuals and the representatives of such institutions have been invited before the committee, and their testimony carefully taken. As a result of their investigations, the committee ask leave to submit the following unanimous report:—

First. In relation to the preamble and resolutions offered by Dr. N. S. DAVIS, touching the Massachusetts Medical Society, your committee recommend them for unanimous adoption by the Association. They are as follows:—

Whereas, It has been represented that the Massachusetts Medical Society considers that its delegations to the annual meeting of the American Medical Association, in Washington, May, 1870, were unjustly excluded by the Committee of Arrangements: *And whereas,* the action of the Committee on Ethics at the same meeting, in refusing to allow the right of said Committee of Arrangements to exclude the Massachusetts delegates, is not yet fully understood by the members of that Society; therefore,

Resolved, That this Association acknowledges the great and effective efforts of the Massachusetts Medical Society to elevate the profession, and to suppress quackery of all sorts; and especially assures that Society of encouragement and support in its present exertions to rid itself of all pretenders.

Resolved, That the said Association trusts that hereafter there will be an united and harmonious action of all the several bodies of which the Association may be composed.

Resolved, That a copy of these resolutions be forwarded to the President of the Massachusetts Medical Society.

On motion, this was unanimously adopted by the Association.

Second. In regard to the official communication of the Corresponding Secretary of the Medical Association of the District of Columbia, certifying that Drs. JNO. D. BARNES, S. S. BOND, A. MCWILLIAMS, W. E. POULTON, S. B. BLANCHARD, S. W. CALDWELL, J. L. CROUSE, JAS. PHILLIPS, and GEORGE SYLVESTER have forfeited their membership in that Society by reason of not having paid their dues for three years, and after repeated notices of the fact and its consequences, your committee recommend that their names be stricken from the roll of membership, in accordance with the *fifth paragraph of the second section* of the constitution of

this Association. Also the same in regard to Dr. D. W. BLISS, who is under sentence of expulsion from the same Society.

On motion, this was unanimously adopted by the Association.

Third. In regard to alumni associations of medical colleges, your committee do not regard them as such medical societies, constituted of a permanent local membership, as were intended by the second paragraph of section second of the constitution of this Association, and hence they recommend that no delegates be received from any of the alumni associations of medical colleges in any part of the country.

On motion, this was unanimously adopted by the Association.

Fourth. In regard to the Pathological Society of Berks County, Pa., the registration of whose delegates had been postponed on account of the protest alleging the want of good standing on the part of that society, your committee postponed the final consideration of the subject for want of time to procure proper evidence.

On motion, further action on this institution was postponed.

Fifth. In regard to the Academy of Medicine of Washington, D. C., the Freedmen's Hospital of the District of Columbia, and the Medical Department of Howard University, the registration of whose delegates has been postponed by the Committee of Arrangements, on account of want of *good standing* on the part of those institutions, as indicated by the action of this Association at its annual meetings in 1870, '71, and by information communicated to that committee, we report the facts as follows:—

1. That this Association, at its meeting in San Francisco, May, 1871, by the emphatic vote of 83 to 26, refused to so amend the constitution as to admit delegates from colleges in which women are taught and graduated in medicine, and hospitals in which medical women graduates in medicine attend.

2. That this Association, at its annual meeting in May, 1870, declared, by an almost equally emphatic vote, that a medical society constituted in part of members who are not licensed to practise in accordance with the civil law governing the practice of medicine in the State or district in which the society is located, is not entitled to representation in this Association.

3. That sections 3, 4, and 5 of the Act of Congress of July, 1838, incorporating the Medical Society of the District of Columbia, and which has been the law regulating the practice of medicine in that District to the present time, requires all persons coming into the District to practise medicine, to apply for, and within six months obtain, a license to practise from a Board of Examiners

appointed for that purpose; and makes it a misdemeanor, punishable by a fine of fifty dollars, for every act of practice without such license.

4. That it has been fully proved before your committee, by the testimony of several witnesses, that the medical society called the "Academy of Medicine" of Washington, D. C., now contains in full fellowship at least four or five members who have never applied for or obtained license to practise, and yet are actually practising in the District, and three of whom are on the list of delegates sent by that society to represent it in this meeting of the Association. Also, that one of these same *unlicensed* men is a member of the medical staff of the Freedmen's Hospital, and that all the members of the medical staff of that hospital are members of the Academy of Medicine. Also, that several of the faculty of Howard University are members of the same Academy of Medicine, and one of the teachers is a woman.

In view of these facts, your committee cannot regard either of the three institutions named as in good standing, whether tested by the civil law, the former decisions of this Association, or by its Code of Ethics; and hence we recommend that the delegates from these several institutions be not received into this body.

Dr. R. Reyburn, of D. C., obtained the floor, but granted Dr. Davis permission to read the next and final section of the report, which was in reference to the resolution of Dr. W. R. Finley, of Pa., asking of this committee a clear interpretation of what is now a part of the By-laws of the Association.

Sixth. That members of the profession hired by the month or year for definite, stipulated wages, by individuals, families, railroad or manufacturing corporations, or any other money-making institution whatever, for ordinary medical and surgical practice (always excepting benevolent and eleemosynary institutions, and medical officers of the Army and Navy), are to be classed as "irregular practitioners," and thereby disqualified for membership in this Association, or in a county or city society.

On motion, this matter was referred by the Association to the several State Societies.

The report was signed by the entire committee:—

HENRY F. ASKEW, Chairman.
N. S. DAVIS, Secretary.
CALVIN SEAVY,
J. K. BARTLETT,
S. D. GROSS.

Dr. ROBERT REYBURN, of District of Columbia, took the stand and defended his claims for admission as a delegate. He asserted that the Medical Society of the District of Columbia required the taking of a license for no good purpose, but rather for its own emolument; and that it had licensed Homœopathic practitioners. He asserted that the law requiring licenses had been disregarded by the local courts; and being considered unconstitutional, could not be enforced. The Howard University, he said, received all who applied for medical education, without distinction of color or of sex. There was an aristocracy in the profession of Washington which was opposed to this, and to all medical bodies not in affinity with or agreed to by the Medical Society of the District of Columbia. If the Association see fit that institutions of that class shall not be represented, of course they have the power so to act, but, at the same time, they should consider well what they were doing before taking such a step. He thought that every human being should be allowed the right to the very highest development that God has made him capable of.

Dr. SAMUEL C. BUSEY, of District of Columbia, replied:—

He would not have taken part in this discussion had not Dr. REYBURN made accusations against the Medical Society of the District of Columbia, which he had the honor, in part, to represent on this floor, and that he would, in replying to that gentleman, confine himself strictly to a refutation of those accusations.

The first charge uttered by Dr. R. was that the Medical Society of the District of Columbia licensed irregular practitioners of medicine. He would not deny that one or more licentiates of that Society had pursued the practise of medicine in an irregular manner, but as the law of Congress, incorporating that body, expressly stipulated that it should grant licenses to all "gentlemen" who presented diplomas from regular medical colleges, or passed a satisfactory examination, after four years' study, he denied that the Society was any more responsible for the mode of practise pursued by its licentiates, than the faculty of any college was for its graduates, and asserted, without the fear of contradiction, that that Society had never admitted to membership any irregular practitioner of medicine. He challenged Dr. REYBURN to cite a single instance, and charged that Dr. REYBURN, and his colleague Dr. PALMER, were members of the Department of Hygiene and Medical Sciences of the Academy of Literature, Science, and Art, which organization admitted to membership irregular practitioners; that

both were professors in Howard University, with the faculty of which a woman was connected as a teacher; and that they and others were associated with the same female in a public Dispensary in the City of Washington.

The second charge made by Dr. R. was, that the Medical Society of the District of Columbia charged the fee of ten dollars for its license; and that it used the money, thus collected, for improper purposes.

It was true, that such a fee was charged and collected, a portion of which was expended in defraying the ordinary and incidental expenses; but the larger portion was returned to the licentiates, in the form of a diploma, which is issued to every licentiate; and he defied and challenged Dr. REYBURN to mention one instance in which that Society had appropriated one dollar of its funds for any improper or dishonorable purpose.

The third accusation was that the profession in the District of Columbia was aristocratic. Dr. BUSEY was at a loss to know by what rule or criterion Dr. REYBURN determined the aristocratic feelings, sentiments, or acts of the profession in the District of Columbia. As the Medical Society licensed all males who presented to its Board of Examiners a diploma from a regular medical school, without reference to color, social standing, or pecuniary responsibility, he could not discover upon what basis that charge could rest.

The fourth accusation was that the Society had not attempted to maintain its authority through the local courts. This Dr. B. said was true. The profession in the District of Columbia had not and would not resort to the courts to maintain its authority. It would appear neither in the courts nor in the halls of Congress, unless dragged there by assaults from that gentleman and those acting with him; but when it had been compelled to defend itself before Congress from the accusations made by Dr. REYBURN and others, in their attempts to destroy its character, victory had come to that Society, and defeat and mortification to its assailants. The members of the profession in the District of Columbia, standing upon its honor and dignity, appealed neither to courts nor legislative bodies, but to their peers—to this body, which was the only competent arbiter and tribunal to determine questions of medical honor, of ethics, and professional decorum. On a former occasion, the Medical Society of the District of Columbia had successfully met these issues before this body, and it appealed again with confidence of a triumphant vindication.

The fifth charge was that Judge Carter had decided that the law of Congress, incorporating the Medical Society of the District of Columbia, was unconstitutional. It might be true that Judge Carter had expressed such an opinion; but certainly no question had been submitted to any court of adjudication, involving the constitutionality of the law of Congress; nor did he understand how one Judge of a bench of five could determine the constitutionality of a law of Congress; and, holding as he did, that the Supreme Court of the United States was the only tribunal which could positively determine such a question, before which no question concerning the Medical Society of the District of Columbia had ever been brought, he denied that there was any foundation for such a statement.

The sixth and last allegation was that the Medical Society of the District of Columbia maintained that no other medical society in the District of Columbia could be organized without its sanction. The Medical Society maintained no such ridiculous position. It simply held that the law of Congress governing the practice of medicine in the District of Columbia must be complied with; and while societies might organize for literary purposes, no medical society, or hospital, or other medical institution in the District of Columbia, could claim representation, in this Association, which admitted to membership, or recognized, medical men and women, who were not qualified by the law of the land to practise medicine.

In conclusion, Dr. B. said the profession in the District of Columbia did not appear there as prosecutors. The Committee of Arrangements, all of its members residing in the city of Philadelphia, had, in the faithful and impartial discharge of its duty, excluded the delegates from certain institutions in the District of Columbia, holding that such institutions, having been excluded on a former occasion for sufficient cause, could not be admitted until they were purged of their offences and misdemeanors. This action had been approved by the Committee on Ethics, and the profession of the District of Columbia stood there ready, willing, and determined to sustain that decision, and appealed to this body to re-affirm its decision made in Washington in 1870. It appealed to this body to encourage and sustain it in its efforts to maintain the honor and dignity of the profession and its determination to abide by and uphold the law of the land; and he predicted, that, should this body re-affirm its former decision by adopting the recommendation of the committee, the profession of the District of Co-

lumbia would appear at St. Louis in 1873, a united and harmonious body.

Dr. J. R. BRONSON, of Massachusetts, asked if colored physicians were licensed by this board.

Dr. BUSEY replied that they were.

Dr. PALMER, of the District of Columbia, explained his position as a Professor in the Howard University, and defended the appointment of and association with a woman lecturer in the corps of teachers. He said he had not practised medicine in that city, and, therefore, had not procured a license, as the law requires. He admitted that he belonged to the Section of Medicine and Hygiene, of the Washington Academy of Literature, &c. He complained that he had been refused admission as a permanent member, and had been denied the right to defend himself against the charges which had been preferred against him. He did not understand why he should be excluded from this Association on account of his connection with the Institution which he claimed to represent.

Dr. EDWARD HARTSHORNE, of Pennsylvania, asked that the Committee of Arrangements be placed right upon the record as to the treatment of these claimants; and noticed the complaint of Dr. PALMER (of exclusion from permanent membership, and denial of the right to defend himself) only to deny it as unworthy of attention. He also contradicted Dr. REYBURN in regard to the complaint that they had been allowed to come to Philadelphia without notice of the objection to them; and stated that they had all been warned some weeks previously, and again by a note, from the chairman of the Committee of Arrangements, written expressly for the information of Dr. REYBURN, and forwarded to him (with the request to show it to his fellow delegates of each questioned institution) on the 1st of May—an answer to which had been mailed by Dr. REYBURN before leaving Washington.

Dr. REYBURN did not deny the reception of this note. He maintained, however, that, having been sent through an agent instead of directly, it had failed to reach him in time to enable him to notify the others.

The previous question was now demanded and sustained.

On motion of Dr. L. A. SAYRE, of New York, the report of the Committee on Ethics was received and adopted by a very large majority.

On motion, the Association adjourned until Friday, May 10, at 10 A.M.

FOURTH DAY.

FRIDAY, MAY 10.

The Association was called to order at 10 A.M., by the President.

Dr. A. B. PALMER, of Michigan, offered the following, which were unanimously adopted:—

Whereas, It has pleased the Great Ruler of the Universe, to take from us our former President, Dr. ZINA PITCHER, of Detroit, a man of large attainments, of unspotted character, of great benevolence, and unusual devotion to the profession of his choice; therefore

Resolved, That in the death of Dr. PITCHER, the profession has lost one of its purest members, the community one of its greatest benefactors, and this Association one of its most dignified and genial members.

Resolved, That we mingle our sympathies with the family and the immediate friends of the deceased, and that a copy of these resolutions be transmitted, by the President of the Association, to his bereaved family.

Dr. P. PINEO, of Massachusetts, offered the following amendment to the constitution, which was laid over till next year:—

Resolved, That the United States Marine Hospital Service be placed in the same relative position in the American Medical Association as the Medical Departments of the United States Army and Navy.

And that, in paragraph 2, of the 2d section of the constitution, after the words "army and navy," the words "and the United States Marine Hospital Service" be inserted.

Also, in section 6 of the by-laws, after the words, "the chiefs of the bureaus of the army and navy," be inserted "and the supervising surgeon of the United States Marine Hospital Service."

The Committee on Nominations presented their final report, which was on motion adopted.

Special Committees.

Committee on Vaccination.—Dr. T. N. WISE, of Kentucky.

Committee on Diseases of Colorado.—Dr. JOHN ELSNER, of Colorado.

Committee on the Treatment of Fractures.—Dr. LEWIS A. SAYRE, of New York.

Committee on Gunguillia, a Substitute for Quinia.—Dr. WM. CHEW VAN BIBBER, of Maryland.

Committee on Gynæcology.—Dr. MONTROSE A. PALLEN, of Mo.

Committee on the Climatology and Epidemics of—

Alabama,	Dr. T. C. OSBORN.
Arkansas,	" G. W. LAWRENCE.
California,	" W. H. WILLIAMS.
Colorado,	" R. G. BUCKINGHAM.
Connecticut,	" J. C. JACKSON.
Delaware,	" L. P. BUSH.
District of Columbia,	" J. W. H. LOVEJOY.
Georgia,	" G. M. MCDOWELL.
Illinois,	" DAVID PRINCE.
Indiana,	" DUGAN CLARK.
Iowa,	" G. M. STAPLES.
Kansas,	" TIFFIN SINKS.
Kentucky,	" L. P. YANDELL, SR.
Louisiana,	" S. M. BEMISS.
Maine,	" S. H. TEWKSBURY.
Maryland,	" C. H. OHR.
Massachusetts,	" EPHRAIM CUTTER.
Michigan,	" S. H. DOUGLAS.
Minnesota;	" CHARLES N. HEWITT.
Mississippi,	" S. V. D. HILL.
Missouri,	" T. B. LESTER.
New Hampshire,	" G. A. CROSBY.
New Jersey,	" E. M. HUNT.
New York,	" GOUVERNEUR M. SMITH.
North Carolina,	" E. BURKE HAYWOOD.
Ohio,	" J. A. MURPHY.
Oregon,	" HORACE CARPENTER.
Pennsylvania,	" W. L. WELLS,
Rhode Island,	" ED. T. CASWELL.
South Carolina,	" M. SIMMONS.
Tennessee,	" W. K. BOWLING.
Texas,	" S. M. WELSH.
Vermont,	" G. B. BULLARD.
Virginia,	" H. A. CLAIBORNE.
West Virginia,	" H. W. BROCK.
Wisconsin,	" J. K. BARTLETT.

Dr. J. G. STETLER, of Pennsylvania, offered the following, which on motion was laid on the table:—

Whereas, The American Medical Association did refer the whole subject of contract physicians—after the report of the Committee on Ethics on the subject—to the various State Medical Societies,

Therefore, Resolved, That everything relating to this subject be rescinded or stricken from the ordinances of this Association.

The report of Dr. HEWITT on the Climatology of Minnesota, presented too late for action by the Section on that subject, was referred to the Committee of Publication.

A voluminous paper on Yellow Fever, by Dr. JOS. JONES, of Louisiana, was presented from the Section on Practice of Medicine and Obstetrics, with the report that it was impossible for said Section to properly examine it in the short time at their disposal.

On motion of Dr. C. WISTER, of Pennsylvania, it was

Resolved, That the paper of Dr. JONES, of New Orleans, be returned to the author, with the request that he will abridge his paper if possible; and if not, to present it next year to the chairman of the Section on Practice, thirty days previous to the meeting as directed by law, so that it may have due consideration.

The Section on Chemistry and Materia Medica reported their minutes; which, on motion, were referred with the accompanying papers to the Committee of Publication.

Two papers offered by Dr. C. F. PERKINS, of Pennsylvania, were referred back to their author; as the Section had not time to properly examine them.

Dr. L. P. BUSH, of Delaware, offered the following, which, on motion of Dr. PORTER, of Delaware, was adopted by a vote, standing.

The removal, in the order of Divine Providence, by death, of Dr. W. W. GERHARD, of this city, marks an event of more than ordinary importance, therefore,

Resolved, That the combination of high talents, with education in careful and extensive observation, and close analysis, as preliminary to his entering upon the practice of medicine, pursued with extraordinary diligence under the most favorable advantages, in the Hotel Dieu, in the Clinic of that great master, Baron Louis, perfected him in the diagnosis especially of the diseases of the heart and lungs, and of typhoid fever; and added to this, his pathological knowledge, brought with him from abroad, was so remarkably accurate,—and so admirably and successfully were these accomplish-

ments exhibited to his classes in the Blockley Hospital, the first field of his labors after his return home, and afterwards in the Pennsylvania Hospital, that they could not fail to imbue the classes with the enthusiasm which manifested itself in his teachings.

The profession of that day without hesitation accorded to him, though a very young man, a position, *primus inter pares*, and hence his reputation spread through the country, and brought to him from all sections those who desired the benefit of his wise judgment in disease.

Resolved, That this Association desires to record thus its high appreciation of the services and character of this lamented member of the profession, and that a copy of these resolutions be transmitted to the family of the deceased.

Dr. L. J. DEAL, of Pennsylvania, chairman of Committee on Cultivation of the Cinchona-tree in the United States, presented the following report, which, on motion, was accepted and referred to the Committee of Publication.

The committee appointed by the American Medical Association to memorialize Congress on the cultivation of the Cinchona-tree in the United States, beg leave to present the following report:—

The memorial which was prepared by your committee and endorsed by the Association was duly presented in Congress and referred to the Committee on Agriculture. No farther action appears, however, to have been taken upon it.

Your committee, however, has not been idle, as will be seen by the following facts.

A committee was appointed by the Medical Society of the State of California, at their annual meeting in 1870, "to address the Legislature of California, and petition that honorable body to appropriate suitable lands for the purpose. Drs. A. B. SROUT and T. M. LOGAN were the committee selected." These gentlemen prepared a bill, which was introduced near the close of the last session of the Legislature. Owing to the fact that this bill was introduced so late in the session, it was not passed. A very favorable feeling was expressed towards the matter, however, and your committee have no doubt that a similar bill will be introduced, and the lands granted.

In the mean time the chairman of your committee had opened a correspondence with the Hon. Mr. Watt, Commissioner of Agriculture. Mr. Watt gave assurance of his cordial co-operation in this matter, and has promised to supply whatever seeds may be desired.

A correspondence has also been carried on between the Commissioner of Agriculture, the State Medical Society of California, and a certain F. A. C. Grebner, who has had fourteen years' experience in the cultivation of this plant in Java, and who is willing to assist in the introduction of the plant into this country.

In accordance with these facts, a second memorial has been prepared for presentation to Congress, which is herewith presented.

Bearing in mind the fact, that, although Dr. Royle drew the attention of the British Government to the importance of this matter and earnestly urged their action as early as 1839, it was not until twenty years thereafter that the first step was taken in what has proved to be so successful an undertaking as the cultivation of Cinchona in India; and knowing that this matter is already receiving favor here, your committee feel that their efforts have not been entirely useless.

Your committee would further suggest, that, since Dr. Antisell has been appointed upon a commission which will compel his absence from the United States for some years, and will prevent his co-operation with the other members of the committee, the name of Dr. A. B. Stout, of San Francisco, be substituted for his, and that the committee as thus constituted be continued.

TO THE HONORABLE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA:

Whereas, The American Medical Association, composed of delegates appointed from the State, County, and local Medical Societies throughout the whole United States, constituting therefore the highest medical authority of the country, presented to Congress nearly two years ago a memorial in which they asked Congress for the appointment of a commission of scientific men to determine certain points in connection with the cultivation of the Cinchona-tree in the United States:

And whereas, Some of these points have already been determined by other experiments in this direction, and the Department of Agriculture is prepared to furnish any needed quantity of the seeds:

And whereas, The cultivation of this tree has already been successfully tried on a large scale by the English and the Dutch governments, and the American Medical Association believe that its cultivation by this government would be productive of a very considerable revenue, provided that the proper soil and climatic

conditions exist in the United States, which conditions the committee of the Association are convinced do exist:

Therefore, The American Medical Association would, through its committee, again respectfully ask the appointment by Congress of a commission of scientific men "to determine what portion, if any, of the public domain of the United States will produce Cinchona, and which may be set apart for the purpose."

For the Committee,

LEMUEL J. DEAL, M.D., *Chairman*,
1103 Vine Street, Philadelphia.

THOMAS M. LOGAN, M.D.,
Sacramento, California.

The special committees were called as follows:—

On the Anatomy and Diseases of the Retina, Dr. R. F. MICHEL, Alabama, Chairman, no report.

On the Comparative Pathology and the Effects which Diseases of Inferior Animals have upon the Human System, Dr. GEO. SUTTON, Indiana, Chairman, reported progress and was continued.

On the Structure of the White Blood Corpuscles, Dr. J. G. RICHARDSON, Pennsylvania, Chairman, had already read his report to a Section, by which it had been referred to the Committee of Publication.

On Vaccination, Dr. T. N. WISE, Kentucky, Chairman, no report.

On Skin Transplantation, Dr. J. FORD THOMPSON, District of Columbia, Chairman, was on motion continued.

On the Nature and Process of the Restoration of Bone, Dr. A. L. MCAUTHUR, Illinois, Chairman, no report.

On some Diseases Peculiar to Colorado, Dr. JOHN ELSNER, Colorado, Chairman, had already been continued by the Committee on Nominations.

On Correspondence with State Medical Societies, Dr. N. S. DAVIS, Illinois, Chairman, reported as follows:—

Your committee, in compliance with the instructions of the Association, at the last annual meeting, have sent printed copies of their Report last year, to the Secretaries of the several State Medical Societies, asking them to call the attention of their respective Societies especially to the resolution appended to the report relating to the subject of the preliminary education of tho proposing to study medicine.

Such of the State Societies as have held their meetings since the

communication was sent have given the subject due attention, and have given indications of most gratifying progress in the development of a proper professional sentiment on that subject. But as many of the Societies have not had time to respond, we would simply report progress and ask to be continued.

On motion, the report was received, and the committee were continued.

On what, if any, Legislative Means are expedient and advisable, to prevent the spread of Contagious Diseases, Dr. M. H. HENRY, New York, Chairman, no report.

On the Climatology and Epidemics of Massachusetts, Dr. E. CUTTER; New York, Dr. W. F. THOMS; New Jersey, Dr. E. M. HUNT; Pennsylvania, Dr. W. L. WELLS; Missouri, Dr. W. S. EDGAR; Texas, Dr. S. M. WELSH; California, Dr. F. W. HATCH; West Virginia, Dr. E. A. HILDRETH; Minnesota, Dr. CHAS. N. HEWITT; Delaware, Dr. L. P. BUSH; Wisconsin, Dr. J. K. BARTLETT; Colorado, Dr. R. G. BUCKINGHAM; Oregon, Dr. E. R. FISKE; South Carolina, Dr. M. SIMMONS; reports either in full or of progress were presented and referred to the Section on Climatology and Epidemics during the session.

On motion of Dr. J. S. WEATHERLY, of Alabama, it was

Resolved, That the Committee appointed to consider the report on Medical Education be allowed to report at our next meeting.

Dr. S. D. GROSS, of Pennsylvania, offered the following amendment to the By-laws:—

SECT. III.—*Standing Committees.*

That, instead of a report on Medical Education, on Medical Literature, and Climatology and Epidemic Diseases, there shall annually be delivered before the Association at its general meetings, an address in Medicine, an address in Surgery, and an address in Midwifery, or the Diseases of Children, the lecturers to be appointed this year by the President; afterwards by the Committee on Nominations.

After some discussion, on motion of Dr. A. B. PALMER, of Michigan, this was laid over for consideration at the next session.

On motion of Dr. E. L. HOWARD, of Maryland, it was

Resolved, That a committee of three be appointed to report at the next meeting of the Association, a plan for the better arrangement of the Sections, and for the more rigid examination of papers offered for publication.

Committee, Drs. E. L. HOWARD, of Maryland, J. R. BRONSON, of Massachusetts, and R. E. ROGERS, of Pennsylvania.

The following preamble and resolutions, offered by Dr. HENRY HARTSHORNE, of Pennsylvania, at the Section on Chemistry and Materia Medica, and by them having been approved, were, on motion, unanimously adopted by the Association:—

Whereas, In all capital criminal trials involving questions of medical jurisprudence, there is an obvious disadvantage in the testimony of the scientific experts, being made to appear partial and antagonistic by their being engaged as witnesses upon one or the other side; therefore,

Resolved, That it is the sense of this Association, that in important criminal cases requiring the evidence of medical or chemical experts, the cause of justice will be promoted by the appointment by the court, in every such case, of a commission of experts empowered to collect all purely scientific testimony bearing on the case, and report upon it to the court by which the case is to be tried.

Resolved, That by the appointment of such scientific commission, the present system of summoning chemical and medical witnesses in criminal trials might be dispensed with to advantage.

Resolved, That the same recommendation applies also to cases of accusation of surgical or medical malpractice.

Resolved, That the State Associations be requested to bring this matter at an early date before their respective legislatures.

The Section on Meteorology, Medical Topography, and Epidemics reported their minutes, which, with the accompanying papers, were, on motion, referred to the Committee of Publication.

On motion of Dr. D. MURRAY CHESTON, of Pennsylvania, it was

Resolved, That Dr. H. F. ASKEW, of Delaware, be requested to prepare suitable resolutions relative to the late Professor SAMUEL JACKSON, M.D., for entry on the minutes. They are as follows:—

Whereas, It has pleased Divine Providence, since the last annual gathering of this learned assembly, to remove to a happier sphere one of the brightest ornaments of our profession; one of the most honored and beloved citizens of the great centre of science in which we are convened; one of the most conspicuous lights of the school from which so many of us are proud to date the commencement of our professional career—he being ripe in years and rich in noble works; therefore

Resolved, That we have heard with deep emotion of the recent

decease of SAMUEL JACKSON, M.D., Emeritus Professor of the Institutes of Medicine in the University of Pennsylvania. And while bowing to the decree that sets finite boundaries to the duration of all usefulness, the thankfulness that his increasing efforts for the benefit of the species and his untiring energies were permitted to continue so far beyond the term of professional activity will long be linked with the saddened memories of the cheerful voice and urbane manner that robbed study of its tedium, and caused the brow of science to relax its sternness.

Resolved, That the fame of Dr. JACKSON belongs to history, and we shall not dwell upon it here. Feeble in health and suffering for many years from painful physical disabilities, the fire of genius bore him aloft, and his mental labors were continued to the end.

Beginning his strictly professional studies unusually late in life, after a long career in a kindred occupation, he brought to those studies a maturity of mind, and an acquaintance, both theoretical and practical, with the fundamental branches of chemistry and the materia medica, not to be acquired during the occupations of those who pass directly from the elementary studies of the medical schools to the engrossing daily duties of the practitioner. This previous training rendered him invaluable as a teacher, and gave additional strength and importance to his judgment at the bedside. In all his intercourse with his professional brethren he upheld the dignity of the calling, and by his example discouraged the little artifices and petty jealousies by which men of smaller minds sometimes lessen the reputation and diminish the usefulness of an art not inaptly termed Divine, and which to be respected must ever remain what its great founders made it, *liberal* and *unselfish*.

Resolved, That it was not only as a teacher and practitioner that Dr. JACKSON ranked with the noblest of the golden age of American medicine—the age of RUSH, WISTAR, and PHYSICK. He was not merely honored for his learning, admired for his genius, and valued for his industry; he was beloved for his urbanity and heartfulness. In all these qualities, those now gray amongst us and who shared in his earlier labors, will tell you "that the boy was father to the man," for he carried the frankness of youth to nearly the extreme of age. The very few still living who sat under the teachings of the giants will join us in the assurance that no other distinguished star in the medical firmament in somewhat more recent times, has left a stronger claim upon the respect of posterity than that which results from his having added, by his

keen perception of merit and his urgent persuasion, this now lamented pleiad to the galaxy of fame that haloes the brow or sparkles in the diadem of the University of Pennsylvania.

The records of our profession furnish few more touching examples of proper gratitude than the bequest of Dr. JACKSON for the erection of a monument to commemorate the memory of his much-loved friend and preceptor, the late Dr. NATHANIEL CHAPMAN.

Resolved, That, as personal friends or professional brethren of one who had no enemy, we sincerely sympathize with the family of the deceased in their and our common loss.

Resolved, That the Secretary of this Association be instructed to have these resolutions transcribed and certified to, and present them to Mrs. MARY JACKSON, the widow of the deceased.

Dr. C. PERCY LA ROCHE, of Pennsylvania, offered the following, which, on motion, was laid on the table:—

Resolved, That the American Medical Association invite their medical brethren throughout the civilized world to join them in a Medical Congress, to be held in 1876, at such place as may be designated by the Association at its next meeting in St. Louis.

On motion of Dr. ALEX. W. STEIN, of New York, it was

Resolved, That the committee appointed at the meeting of this Association, held at Washington, May, 1870, to report on what means are expedient to prevent the renewal of prescriptions by druggists, without the consent of the physician ordering said prescription, be continued another year.

On motion of Dr. EDWARD HARTSHORNE, of Pennsylvania, it was

Resolved, That the thanks of this Association are presented to the officers and proprietors of the various public institutions and industrial and other establishments, and to the officers in command of the United States Navy-yard and the League Island Station, in Philadelphia, in acknowledgment of the kind invitations extended to the Association.

Resolved, That the cordial thanks of this Association are due, and are hereby presented, to the authorities and congregation of the First Reformed Presbyterian Church, in Philadelphia, for their timely and generous permission to occupy their building.

On motion of Dr. EDWARD HARTSHORNE, of Pennsylvania, it was

Resolved, That the honor of a vote, standing, which has been accorded to the memory of the late Dr. W. W. GERHARD is eminently due, and is hereby offered, to those of the late Prof.

S. HENRY DICKSON, of Jefferson Medical College, and of the late Prof. SAMUEL JACKSON, of the University of Pennsylvania, both of whom have recently deceased. Their names and reputations, like that of Dr. GERHARD, are identified with the history of medicine in America. The American Medical Association owes them a record of grateful recognition, which would be as much an honor to itself as to their memory.

Resolved, That copies of this resolution be sent to the families of the deceased.

On motion of Dr. EDWARD HARTSHORNE, of Pennsylvania, it was

Resolved, That Dr. J. M. DA COSTA, of Pennsylvania, be appointed a committee to prepare an appropriate notice of the death of Prof. DICKSON, to be placed upon the minutes, and to be conveyed to the family.

Dr. HENRY M. SKILLMAN, of Kentucky, offered the following:—

Whereas, Dr. WILLIAM B. ATKINSON has served the Association for eight years in the arduous office of Permanent Secretary without any sufficient remuneration: *And whereas*, his duties must become more engrossing every year, and their proper performance must interfere with other more profitable employment, and entail labor upon him well deserving compensation;

Be it resolved, That he receive the thanks of the Association for his past services, and that the occupant of the office of Permanent Secretary shall hereafter be paid a salary of $1000 per annum in quarterly payments.

After some discussion, on motion of Dr. N. S. DAVIS, this matter was referred to a special committee of three, to be appointed by the President, to report at the next meeting.

Committee, Drs. N. S. DAVIS, of Illinois; J. P. WHITE, of New York; EDWARD HARTSHORNE, of Pennsylvania.

On motion of Dr. EDWARD C. HARWOOD, of New York, it was unanimously

Resolved, That we return our grateful thanks to our Permanent Secretary for his valuable services; and as a more permanent testimonial to his merit, we present him the sum of $500.

On motion of Dr. T. M. LOGAN, of California, it was

Resolved, That the thanks of this Association be extended to the Committee of Arrangements, the College of Physicians of Philadelphia, the Biological and Microscopical Section of the Academy of Natural Sciences, the Faculties of the University of Pennsylvania, and Jefferson Medical College, the members of the medical

profession of Philadelphia, and the citizens of Philadelphia generally, including all who have contributed to the admirable collection of professional and scientific objects in the museum at the Hall of the College of Physicians—and particularly to Col. THOMAS A. SCOTT—for their many kind attentions and hospitalities to the members of this Association.

The following, offered by Dr. HENRY HARTSHORNE, of Pennsylvania, was laid on the table:—

Resolved, That re-affirming the resolution of 1870, by this Association, recognizing Horace Wells as the discoverer of the practical application of anæsthesia for surgical purposes, we hereby acknowledge the good-will and sense of justice evinced by Sir James Y. Simpson, and others in England, towards an American discoverer which led to originating in England of the "Horace Wells Testimonial Fund," and we cordially recommend a movement in this country for the same purpose.

On motion of Dr. L. S. BOLLES, of Pennsylvania, it was

Resolved, That the resolution offered by Dr. ASKEW, of Delaware, and adopted by this Association, to wit: "that all questions of a personal character, including complaints and protests, and all questions of credentials, be referred at once, after the report of the Committee of Arrangements or other presentation, to the Committee on Ethics, and without discussion," be adopted by the Association as a standing resolution.

The minutes of the Section on Surgery and Anatomy were received; and were, on motion, referred, with the accompanying papers, to the Committee of Publication.

Dr. JAMES PARSONS, of New York, offered the following, which was adopted:—

Whereas, Paluel De Marmon has been permitted to register as a delegate from the Westchester County Medical Society of New York; and *Whereas*, he was appointed nearly a year ago, and while he was supposed to be in good standing, but since that time his name has been stricken from the Yonkers Medical Association; and *whereas*, he has been refused admission to the New York Academy of Medicine, and charges will be brought against him for unprofessional conduct at the annual meeting of the Westchester County Medical Society;

Therefore, Resolved, That the name of Paluel De Marmon be expunged from the register, and his case be referred to the Com-

mittee on Medical Ethics, with instructions to report at the next annual meeting of this Association.

On motion of Dr. W. O. BALDWIN, of Alabama, it was

Resolved, That a special committee on the relations between physicians and druggists be established, and that Dr. R. J. O'SULLIVAN be appointed chairman of said committee, with a request to report at the next meeting of the Association.

Dr. J. M. TONER, of the District of Columbia, offered the following, which was laid on the table:—

Resolved, That a committee of three be appointed by the Chair to consider and report at the next meeting of the Association a suitable design for a medal of membership.

Dr. W. S. HUSELTON, of Pennsylvania, offered the following, which, on being put by Vice-President Dr. T. M. LOGAN, was unanimously adopted:—

Resolved, That the thanks of the Association are tendered to the retiring President, Dr. YANDELL, for the able and impartial manner in which he has presided over our deliberations during the present session.

The President appointed as delegates to the British Medical Association, Drs. CHAS. A. HART, of New York; JOHN DAVIES JACKSON, of Kentucky; J. R. BRONSON, of Massachusetts; F. HENDERSON, of Alabama, J. F. JOHNSON, of Alabama, J. M. DA COSTA, of Pennsylvania; SAMUEL D. GROSS, of Pennsylvania; and BENJ. F. DAWSON, of New York.

Dr. W. W. REESE, of New York, offered the following, which was laid on the table:—

Resolved, That whilst we admit the right of women to acquire medical education and to practise medicine and surgery in all their departments, we deem the public association of the sexes in our medical schools and at the mixed clinics of our hospitals, as impracticable, unnecessary, and derogatory to the instincts of true modesty in either sex.

On motion of Dr. T. J. GALLAHER, of Pennsylvania, it was

Resolved, That the thanks of this Association be tendered to Drs. W. H. PANCOAST, and HUGH L. HODGE, for their very elegant and sumptuous entertainments given to the members of this body.

On motion of Dr. R. W. GIBBES, of South Carolina, it was

Resolved, That the thanks of the American Medical Association be tendered to those railroad companies which have kindly reduced their rates of fare to our delegates.

The following, offered by Dr. I. N. QUIMBY, of New Jersey, was laid on the table:—

Whereas, Fatal results do sometimes occur from physicians neglecting to write on their prescriptions how the medicines are to be taken,

Therefore Resolved, That the safety of the community requires that in all cases in which active remedies are prescribed for external or internal use, the apothecary to whom the prescription is sent, be requested by the prescriber, to write legibly on the phial, or other receptacle containing the medicine prescribed, the precise dose or manner of using the same.

On motion of Dr. R. E. ROGERS, of Pennsylvania, the resolution of Dr. REESE relative to the teaching of female students at the same hour and place with males was taken from the table and again considered. After some discussion, on motion of Dr. EDWARD HARTSHORNE, it was indefinitely postponed.

On motion of Dr. J. MORRIS, of Maryland, it was

Resolved, That the thanks of the Association are tendered to the members of the press of Philadelphia, for their faithful reports of our proceedings.

Dr. N. S. DAVIS then moved that after the President had given a farewell address, the Association should adjourn to meet in St. Louis, on the first Tuesday of May, 1873.

The President then thanked the members for their kindness and courtesy to him, expressed his appreciation of the high character and unusually large number of the members assembled at this meeting, and of its harmonious and successful conduct, and declared the session adjourned to meet at St. Louis, Missouri, on the first Tuesday of May, 1873.

WILLIAM B. ATKINSON,
Permanent Secretary.
D. MURRAY CHESTON,
Assistant Secretary.

REPORT

OF

THE COMMITTEE OF PUBLICATION

AND OF

THE TREASURER.

REPORT OF THE COMMITTEE OF PUBLICATION.

THE Committee of Publication have little to report beyond the mere announcement of the number of volumes now on hand, and those delivered since the last statement. An edition of seven hundred and fifty copies of Vol. XXII. was issued at an aggregate expense of $1549 39, the items of which appear in the Treasurer's report. Of this edition four hundred and seventy-five copies were delivered, including twenty-three to various medical journals, and eighty-eight are still due to members, and as yet uncalled for. It is no more than just to state that although the volume was a small one, its publication was delayed until early in August, in order that the size of the edition might be determined by the amount of subscriptions received from members. The work was completed and issued early in November.

The Committee desire to remind the members of the Association of a resolution passed in 1870 to the effect: "That if any member fail to reply within a year to the circular sent him by the Committee of Publication, he shall forfeit his right to the volume, and it shall revert to the Association to be sold to any applicant at the current rates.

The accompanying statement exhibits the number of copies of each volume now on hand, and those delivered since the last meeting of the Association.

Statement of Volumes delivered and those remaining on hand.

	On hand at last report.	Since delivered.	Remaining on hand Apr. 1, 1872.
Proceedings	12	2	10
Volume I.	5	1	4
" II.	6	2	4
" III.	3	1	2
" IV.	4	1	3
" V.	190	5	185
" VI.	6	2	4
" VII.	6	1	5
" VIII.	155	4	151
" IX.	185	4	181
" X.	99	3	96
" XI.	112	1	111
" XII.	187	4	183
" XIII.	83	2	81
" XIV.	130	3	127
" XV.	127	2	125
" XVI.	280	4	276
" XVII.	66	4	62
" XVIII.	40	5	35
" XIX.	24	4	20
" XX.	4	2	2
" XXI.	24	19	5
Printed of volume XXII.	750	475	275

All of which is respectfully submitted.

FRANCIS G. SMITH, JR.,
Chairman.

Of Vol. XXII. 88 are due to members, but as yet uncalled for.
23 copies of Vol. XXII. were delivered to medical journals.

REPORT OF THE TREASURER.

THE Treasurer has the honor to report, that the Association at its last meeting exercised praiseworthy discrimination in regard to the amount of material referred to the Committee of Publication, consequently the volume of *Transactions* was smaller, more compact, and more desirable to the profession than heretofore; also that the volume was published at a price which leaves a balance on hand in the Treasury, for use when the Association, forgetful of its prudence, may refer great masses of MSS. and expensive illustrations for publication, and thus not only exhaust its funds, but contract a debt to the publisher.

The Treasurer would also counsel care in the adoption of prize essays, for out of this has arisen both an abuse and an expense, two papers being selected yearly by custom, and adjudged worthy of prizes, without due regard to their originality and value to the profession at large, thus depleting the Treasury to the extent of $200 annually, an expense it can ill afford.

The American Medical Association

DR.

May 1, 1872.	
To balance for 1871	$704 32
" cash from delegates at San Francisco . . .	1095 80
" " from permanent members	1880 00
	$3680 12
May 1, 1872.	
To cash balance on hand	$1005 60

CASPAR WISTER, *Treasurer.*

in Account with Caspar Wister, Treasurer.

CR.

May 1, 1872.		
By cash, Dr. Wm. B. Atkinson, Secretary, for travelling expenses, postage, etc., both at Washington and San Francisco	$356	95
" Account forwarded by Committee of Arrangement at San Francisco	567	20
" Dr. E. T. Taylor, prize essay	100	00
" Dr. B. Howard, prize essay	100	00
" T. K. Collins, for printing, binding, illustrations, and paper, 750 copies of *Transactions;* also circulars, stamps, and envelopes. 5 per cent. off	1472	98
" Henry M. Barnes, for services as clerk	50	00
" Henry C. Lea, for cash advanced, for postage, freight, boxes, etc., used in distribution of *Transactions*	27	39
" Balance on hand	1005	60
	$3680	12

Audited and found correct.

ADDRESS

OF

D. W. YANDELL, M.D.,

PRESIDENT OF THE ASSOCIATION.

ADDRESS OF D. W. YANDELL, M.D.,

PRESIDENT OF THE ASSOCIATION.

GENTLEMEN:—

The migratory character of our Association is one of its best features. If it were stationary its meetings would no doubt be attended by many, and it would, while conducted with wisdom and moderation, exert a good influence upon the profession all over the country. But its influence is incalculably enhanced by its journeyings from point to point. In this way multitudes are brought into sympathy with it who otherwise would never attend one of its meetings or read a page of its proceedings. Whatever else may be denied the Association, no one can hesitate to admit that it is grand in its annual migrations. No other medical body ever in the same time traversed spaces so vast. Last year we met on the western slopes of the Rocky Mountains, and sat with the sound of the many-voiced Pacific in our ears. This year we have assembled on the eastern side of the Alleghenies, and our foreheads are bathed in the gales of the Atlantic. None of us who were privileged to be present at that meeting in San Francisco can ever forget the circumstances attending it. We were introduced to a new world; trees, birds, quadrupeds of new species; an empire which, though the growth of but a quarter of a century, excites the wonder and admiration of mankind.

If the novelty of the scene rendered our meeting in California one of peculiar interest, the meeting here is not less interesting on account of the historical associations of the city in which we are convened. San Francisco is the most recently erected of all our great cities. Philadelphia is the most ancient of all our great medical centres. It is, in a sense, the cradle of American Medicine. Here medical teaching was formally inaugurated on this continent. We seem to hear again this morning the confident words of Dr. John Morgan, spoken one hundred and seven years ago, as he

pleaded for the medical independence of the colonies, and proved to the satisfaction of the citizens of Philadelphia that the time had come when America should have a medical school of her own.

That first faculty, composed of Morgan, Kuhn, Shippen, Bond, and Rush, rises to our mind as we enter on our duties here to-day. The old-school, elegant Shippen, sitting, not very gracefully, on his three chairs, and essaying to teach anatomy, and surgery, and midwifery. The rigid, stately Adam Kuhn, his hands and bosom in ruffles, his exuberant hair done up by his hair-dresser in the style of an imposing wig, presenting with his gold-headed cane a perfect picture of the grave doctor of the preceding age; punctual to the half minute—beginning his lectures just as the clock pealed its last stroke; waiting for the physician who was to meet him in consultation the five minutes of grace, then stalking out of the sick-room, perhaps to encounter his tardy brother on the stairway or the door-steps, but hardly pausing long enough to hear the delinquent's excuse, and never turning back. Rigidly exact in his prescriptions, he has just ordered a patient some weak sage-tea. The kindly nurse meekly suggests, as he walks away, "I suppose, doctor, I may give the patient a little toast-water, or lemonade, too, if she craves it?" And we see him turning round with the solemnity of one who seemed to feel that life hung upon his words, and hear his incisive reply, "I have said sage-tea; good morning, madam." And how strangely sounds to us that declaration of the old professor of practice made near the close of his life: "If called upon to say with what remedies I have done most good in my long practice, I should name the volatile alkali and wine whey."

But in that group of professors, untried as yet, rises far above the rest that figure so familiar to us all, with its meditative face and calm, expansive brow, the philosophic, active-minded Rush. He has just returned from Edinburgh, where he listened to the lectures and enjoyed the friendship of the great Cullen. In all the five years of his pupilage he tells us he never wasted a day in amusement. He has entered into his profession with his whole soul. At the early age of twenty-four he has been elected professor of chemistry. We pursue his steps along his brilliant course as statesman, philanthropist, physician, author; a signer of the Declaration of Independence; a writer on temperance, on insanity, on medical education; author of medical histories so full and graphic that he is soon styled "the American Sydenham." We see him, year after year, battling with the fever that devastated

his city, and with his brethren about calomel and jalap and bloodletting. We read with absorbing interest his accounts of the wasting epidemic, and are thrilled by a passage in his diary, entered at the close of one of his terrible days, just after adopting a new mode of practice: "I have visited one hundred patients today, and, thank God! not one of them has died." His terse, sagacious remarks, repeated everywhere by his pupils till they became household words with the people, come back to us as we meet here where he was so long the master-spirit of the profession. Consulted by our grandfathers in Charleston, in Georgia, in the wilds of Kentucky and Tennessee, he was acknowledged everywhere the head of the profession in America. Students flocked to him as they had done before to Cullen at Edinburgh and to Boerhaave at Leyden. Sitting here in his chair of theory and practice, he gave laws, as nearly as physicians could ever give law, to the profession of a continent, and has left behind him a name the most resounding in our medical annals.

With Rush, after a time, was Caspar Wistar in anatomy, which his eloquence made attractive. No medical man can hear Philadelphia named and not think of Wistar, whose work on anatomy, the first work on the subject by an American, was long a textbook in all our medical schools. Physick too rises among the great names that gave renown to the school at a later period. Cold in manner, unsocial, but grand in the simplicity of his character, he walked the streets of Philadelphia five years, as he has told us, before he made money enough to pay for his shoeleather. And with him is associated the name of his nephew, Dorsey, author of the first American system of surgery, who, unfortunately for the profession, was cut off in his early prime. Prominent among the foremost was one whom many of you have seen, the first President of our Association—the generous, witty, genial, eloquent Chapman, upon whom fell the mantle of Rush when that great man left the earth. You who saw him at Baltimore twenty-four years ago, as he stood up to deliver his inaugural address, can never forget his form, his face, his voice, his whole bearing and manner as that of one who felt that the dignity of a great profession rested on him. In this city too lived for a short time, adorning the profession by his varied labors, the brilliant Godman, at once physician, poet, and philosopher; but, like Dorsey, dying young.

The last link which bound the present with the past has just

been parted. I allude to Dr. Samuel Jackson. Who that remembers his silvery locks, his sparkling eyes, and the sweet and winning smile that overspread his countenance as he expounded his favorite doctrines, can wonder how readily they were accepted as true? What he was in the beginning and in his prime, he continued to the last years of his patriarchal old age. Keen to perceive, eager to learn, earnest to instruct, a man whose attachment to his profession was not that which springs alone from habit or from gratified ambition, but an ardent love which burned brighter and brighter until it was extinguished by the hand of death.

With these eminent names are associated those of Dewees, Hare, Hartshorne, Horner, Meigs, Mütter, Mitchell, Dunglison, and a long list of others that will live in history. They crowd upon our memories as we walk along the streets that once resounded with their footsteps—through a city rendered illustrious by their labors. They have left successors worthy of their great reputation, who have made the air of Philadelphia luminous with their works.

It is an interesting coincidence that the cradle of American medical education should also be the cradle of the American Medical Association. We have once more come back to the spot where the Association was organized a quarter of a century ago. Many of you, in coming to this meeting, return to Alma Mater. No doubt with many this has been the leading inducement to come here. You come to renew the pleasing associations of youth, hoping to grasp once more the hands of the few venerated teachers who still linger on the stage. That with all these attractions this meeting should be the largest in the history of the Association is not surprising. I rejoice with you at seeing such an outpouring of the profession. There is something inspiring in the spectacle here before me. At the same time you will not question my sincerity when I declare to you that I am embarrassed by the duty of having to address so august a body, and would gladly devolve that task on some one better fitted for it than I am.

In proceeding to the discharge of this public duty, I have deemed that I should be safe in pursuing the line of thought marked out for me by many of my distinguished predecessors; I mean in devoting a few words to the subject of Medical Education. This, if it has not been a standing theme before the Association,

has been up so often that it would seem hardly respectful to it not to spend a little time in its discussion.

Medical education has been the one absorbing topic, and if there is a single question upon which presidents and committees of education have agreed, from the first convention in New York down to the last utterance on the subject at San Francisco, it is that the American system of medical education is radically defective. The Association, year after year, has been invoked to remedy abuses and rescue the profession from impending degradation. The Association indeed originated in this wide-spread feeling of discontent with the prevalent condition of things in the profession. "Reform" was the watchword of the convention which met in New York in 1846. Some of the best men in the profession being convinced that nothing could be done without general co-operation, the convention was called in the belief that thus reform might be brought about. The members of that convention came together with no very definite plans of action, but with a feeling that something must be done. The idea of reform has been the idea underlying the whole movement and animating its most active members with a zeal which could hardly have been inspired by a less generous cause.

The first meeting of the convention was an encouraging one, and a second one was called to meet here. This Association was organized, and Chapman, then the foremost of all American teachers of medicine, opened his address the next spring at Baltimore with the declaration that "the profession to which we belong, once venerated on account of its antiquity, its varied and profound science, its elegant literature, its polite accomplishments, its virtues, has become corrupt and degenerate to the forfeiture of its social position, and with it of the homage it formerly received spontaneously and universally."

My old neighbor, Professor Henry Miller, in his address to the Association at New Haven, indulged in the same strain. Borrowing the language of Dr. Drake, he declared that "even at this late period the profession abounds in students and practitioners who are radically deficient in spelling, grammar, etymology, descriptive geography, arithmetic, and I might add book-keeping, but that they generally apply themselves to the study of this important branch with a diligence that supplies the want of early opportunities." And he added, "all candid men who have had any experience in medical schools must confess that the examinations

of the green-room annually reveal a sum of ignorance or of vague and misty perceptions of fundamental medical truth, even in many who are invested with the honors of the doctorate, which is truly amazing. For myself I can most solemnly declare that the most mournful and humiliating passages in my professional life have been these annually-recurring examinations in which such scanty harvests have been reaped as the reward of a winter's faithful toil."

My distinguished and honored master, Prof. Gross, has more recently expressed himself to the same effect. "The future," he declares, "holds out no promise of amendment. We shall go on from bad to worse until the people can stand it no longer, and then we may hope to be able to effect some reform."

Dr. Baldwin, in his able address at New Orleans, confessed his despair of seeing the evils of our system of education corrected through any of the agencies heretofore employed by the Association and could see no mode by which it could be accomplished except Federal legislation, through national medical schools incorporated by Congress. "Make the salaries of the professors large," he says, "and not to depend upon the number of students, and let the Federal Government assume a proper share of the expenses incurred."

It may be because my temperament is more sanguine, or it may be because I am a younger man and less experienced in the profession than most of those who have written in this way about its present state and future prospects; but whatever be the explanation, I have to confess that I do not share in these gloomy views and prognostications. Mine is a more cheerful creed. The profession does not appear to my mind "corrupt and degenerate." I do not believe "it is going from bad to worse," and that the people will have to rise in their majesty to stay its downward progress. I cannot see the thing in this light at all, and so am not ready to appeal to Federal legislation to correct our evils, and certainly should not go to Congress to establish national medical schools.

Beyond all controversy there are grave defects in the education of many of our students, and many of our practitioners of medicine. Not a few of them, I am afraid, have very slight acquaintance with grammar or physical geography, and too many of them know little about etymology, and are bad spellers. It is a pity that this is so, and I should be glad to see a different state of things. But are matters in this respect worse than they were in the time of our fathers? Has the case ever been otherwise, do you suppose, in

all the history of our profession? At what period was the golden age of medicine, when all who professed it were scholars, and all who aspired to its honors were worthy of them?

My learned friend, Dr. Baldwin, was a student in Transylvania University when that medical institution was at the height of its fame. When quoting, with approbation, the comments of Prof. Drake and Prof. Miller on the spelling and grammar of the students and physicians of our day, he could hardly have forgotten that two of the professors at whose feet he sat with so much profit were understood to be bad spellers and by no means accurate in their grammar. I refer to the illustrious Dudley and his distinguished colleague, Dr. Wm. H. Richardson. Dr. Richardson was much less widely known than his associate: but history will record of him that, despite his grammatical inaccuracies, which often raised a smile on the countenances of his pupils, he maintained himself in the school for twenty-six years—in fact, from the organization of the first faculty down to the day of his death—by the side of such scholars as Caldwell, Cooke, Eberle, Nathan Smith, and Bartlett. Nor did I ever hear that his students or those of his eminent associate complained that one cut with less dexterity for stone or the other was less successful as an obstetrician on account of their imperfect English education. The case of Dr. Richardson is the more noteworthy from the fact that at the time when he was first appointed to a professorship he was not even a graduate in medicine, but received the honorary degree of M. D. from the College of Physicians and Surgeons of New York after he had delivered a course of lectures and signed at least one diploma.

Nor can it be affirmed with truth that these noted teachers rose to their distinction by force of great intellectual abilities. They were not endowed with extraordinary mental gifts, but achieved success by bending all the powers of their minds to their special pursuits; and by such wise direction of their facilities they made names which filled their country in their day, Dudley placing himself in the foremost rank of lithotomists, and as a teacher at the head of the faculty of Transylvania University. It is not impossible that among the many medical schools of the country, instances might be found to-day of scholarship as deficient as these; but if they exist the examples are not so conspicuous. Things may be very bad yet in that direction, but it is doing the profession injustice to say they are growing worse.

And after all, I submit most respectfully whether it is not

possible that we have attached too much importance to this humble accomplishment of spelling? A ludicrous blemish assuredly it is on the literary character of any one not to be able to spell correctly, and especially in any one belonging to a learned profession, and it places the individual at a great disadvantage; but I confess I am not able to see why it should prove fatal to success in life, as certainly it did not in the cases just alluded to, and has not done in many others which no doubt occur to you all. Napoleon I., it has been affirmed, never acquired the art of spelling the French language correctly, with all his consummate art in playing upon the imaginations of the French people. And it is a fact well known to the correspondents of our great Andrew Jackson that he was not a correct speller, notwithstanding that the world believes he was a successful leader of armies, and made a President of the United States whom even his enemies were obliged to respect; and, what is more than all this, as bearing upon the question of etymology and orthography, was actually, in his old age, made a doctor of laws by that renowned old Harvard of which we are so proud.

Complaints similar to those so often repeated here in regard to the education of medical students reach us from other countries and from quarters whence we should least expect to hear them. The profession of Great Britain, with all that it has achieved, is by no means satisfied with the state of things in the medical colleges of that kingdom. "The students who come to our medical colleges," says a late English writer, "are, in a large proportion deficient in preliminary education, and wholly untrained to any kind of scientific knowledge or method; they come too young and too little instructed."

Education is indeed a plant of slow growth. Systems of education are perfected only by ages of infinite effort. Railways and telegraphs have wonderfully improved intercommunication between the nations of the earth, but art has not yet pointed out any royal road to learning. It takes a boy now as long to learn to read or write a page, or to commit the multiplication table to memory, as it did our forefathers when travel was over miry roads in stage-coaches or on horseback. The people learn slowly, and are hardly yet awake to the value of education; and our students of medicine come from the people. Of education it may be said, as of nations, it cannot be created; it grows. No wonder then that students sometimes knock at the doors of our medical colleges who

have not gone far into arithmetic or physical geography, and are "too little instructed" generally.

But while awarding censure let us be just in its distribution. Let us ask ourselves whether those "vague and misty perceptions of fundamental medical truth," with which teachers complain of meeting occasionally "in the green-room," may not be somewhat chargeable to the learned professors themselves? "I have a strong impression," says Professor Huxley, "that the better a discourse is as an oration the worse it is as a lecture." Possibly some of our teachers may have erred in that direction and failed from excess of oratory; but I much fear that many more fail in exciting any interest in their pupils. Some I remember to have heard whose lectures had the soporific charm of the divinity course of lectures spoken of by Southey in "The Doctor," the recollection of which twenty years after it was delivered had the power, he declared, of putting him to sleep when every other known narcotic had failed, from "bang to black drop." After such a course one would hardly look for anything better than a "scanty harvest" and "misty perceptions of fundamental truth."

But it is objected to our system of medical education that the schedule in our schools is too meagre, and Italy is cited as a country which furnishes us with an example worthy of our imitation There, we are told, medical students hear lectures, among many other things, on geometry, botany, mineralogy, agriculture, and "the principles of design."

So many of our students out in the West and the South, having served a faithful apprenticeship in the corn-field before coming to our schools, I hope agriculture may be omitted in our curriculum. But why students should be required to study agriculture, or make themselves acquainted with "the principles of design," is more than I can understand; and why Italy should be held up to us at all as a model in medicine at this day seems to me a little strange. I would by no means do injustice to that country. She has a glorious history, and I trust a brilliant hereafter awaits her. We owe to her in modern times the splendid science of galvanism, which has already done so much to enlarge the boundaries of our knowledge, and promises to do much yet in therapeutics. But it will be admitted that Italian books on medicine are not translated into our language any longer, and that we hear very little nowadays of the medical journals of Italy.

But Germany is appealed to as the medical Utopia, where per-

fection in the system of medical education has been attained. Let me read you one of the schedules from that marvellous country after which it is proposed the medical schools of America shall model their course of instruction. It embraces the following: 1. Philosophy; 2. Logic and metaphysics; 3. Æsthetics; 4. Mathematics; 5. Encyclopedia and methodology of medical science; 6. Botany; 7. Anatomy; 8. Natural philosophy; 9. Chemistry; 10 Zoölogy; 11. Physiology and psychology; 12. Anthropology; 13. Mineralogy in its relations with geognosy; 14. General pathology and therapeutics; 15. Materia medica and dietetics; 16. Practical anatomy and practical physiology and pathology; 17. Special pathology and therapeutics; 18. Surgery; 19. Mental diseases; 20. Obstetrics; 21. Pathological anatomy; 22. Comparative anatomy; 23. Pharmacy and the art of prescribing; 24. Epidemiology and climatology; 25. State medicine; 26. And in the hospital, clinical medicine, clinical surgery, clinical ophthalmology, obstetrical clinics, clinics of skin diseases and of syphilis, and chemical physiology and pathology.

Germany at this day aspires to be the leading nation of the earth in thought, in philosophy, in philology, in science, as well as in arms. In perseverance, in industry, in love of science for its own sake, in deep learning, let us admit that no people on earth exceed them. Medicine is cultivated among them with unwearied zeal and assiduity. They have hospitals on the grandest scale; their laboratories are the most ample and best furnished, and all the appliances are to be found in their universities for imparting to students the most thorough knowledge of whatever science or profession they would pursue. Subjects for anatomical study cost a mere trifle. Autopsies by experts abound in the dead-rooms of their hospitals. Students are taught æsthetics, metaphysics, the methodology of medical science, logic, anthropology, geognosy and the twenty other branches named in their curriculum.

And what, let me ask in a spirit of perfect candor, has it all amounted to? In histology, in pathological anatomy, in microscopy, in animal chemistry, their superiority is conceded. In surgery and in midwifery too we all admit their claims to the highest rank. But the practice of physic in Germany at this time, is it much more than *a meditation on death?* Have not *placebos* taken the place of remedies in their hospitals? Standing idly by while disease is running its course, curiously marking its natural history, looking on calmly while Death and Life-in-death, as described in

the "Ancient Mariner," are throwing the dice, and waiting to see whether nature will lose or win in the struggle, the physicians seem intent mainly on tracing its ravages in the cadaver, too well satisfied to find their diagnosis confirmed by the autopsy. Those vast stores of science treasured up by the German mind through the centuries, in what have they resulted? As to therapeutics, in something hardly better than nihilism; as to physiology, in a materialism which not only abolishes religion but renders any religious belief impossible. To this ghastly complexion it may be that American medicine must come at last, but I am sure no philanthropist can be impatient to see the day.

As one casts his eye over this appalling schedule from Germany, he is reminded of the lines in the old song:—

> Could a man be secure
> That his days would endure,
> As of old, for a thousand long years,
> What things might he know!
> What deeds might he do!
> And all without hurry or care.

But if he could, are these the things which, after all, the people want their medical advisers to know? Reduced to the last analysis, what is it that they demand of us as instructors? To give them physicians learned in the languages, or physicians who can discharge the duties of their profession efficiently and well; men who can chop logic, or surgeons who can amputate limbs, or set them, or reduce them; scholars expert in metaphysics, or doctors skilled in the practice of physic? And are not the schools turning out such practitioners? In the main I believe they are, and of higher grade every year. But if I could agree to the German curriculum in all its amplitude, I should still object to the place assigned in it to clinical teaching. With his course on "æsthetics" my student should begin the study of medical and surgical diseases at the bedside. Clinical instruction, in the schedule I would draw up, should be the alpha and omega of the student, and whether he was studying geology or logic he should spend a part of every day examining the cases of sick men, women, and children. After making himself master of his art he might stray as far as he inclined into the tempting fields of literature and natural history, provided his patients raised no warning voice against it.

We are continually reminded in annual reports that while our schools teach too little there are quite too many of them. I think

this is true; but what is to be done about it? Who will say how many schools we shall have, and where? Who has the power to silence one of them? Can we hope to bring our cold, wise maxims of experience so to bear upon the wing of young ambition as to repress it, or to quench the ardor of the youthful spirits who feel that they have a vocation to teach? Time is the only remedy I can see for this sore evil under the sun. Under the pressure of an enlightened public opinion, operating in part through this body for a long series of years, it must give way at last. The schools are obliged to gravitate in time to their places. Those that teach well will be sustained; the inferior will go under.

Twenty-two years ago, in a speech which I had the temerity to make before this Association at Cincinnati, I ventured to predict that no school without an ample supply of subjects and adequate means of clinical instruction could long sustain itself. Time is fully justifying my prediction. And to this test I am satisfied all the medical schools in the world must finally be brought. It is not by logic, or the principles of design, or Greek, or Latin, or French, or German that medical education is to be rendered what it ought to be; but by studying medicine in the laboratory, under the microscope, at the dissecting-table, in the wards of hospitals and in dispensaries where patients are seen, examined, and prescribed for, and where, by attending to what are now so often called the refinements of chemistry and physics, students learn the diagnosis of disease as well as its treatment. Here in the midst of these clinical demonstrations, physic is to be learned, and not by going to universities. Where these are, there will be the great medical centres: not necessarily at the great capitals; but none, where these means of illustration are wanting.

We labor in vain when we get too far in advance of the people. If we write, it is in the hope of being read; and if we find no readers, our writings, however admirable, are to no purpose. Bring to our country the books produced by the ablest of German authors and how many would be read? Is Rokitansky, or Vogel, or Chelius, or Rindfleish, or Virchow? By a few no doubt; but they are "*caviare* to the general." It is not in the direction of elaborate research that the medical mind of America has been running hitherto, or is yet running. In time it will no doubt take that direction; but treatises less elaborate, of less detail, more

pointed and more practical, are what the profession demands just now.

Let me cite a case in illustration of the truth of this remark. Just twenty-two years ago a volume was given to the world by an old professor of the University of Louisville, one of my revered teachers, which all our reviewers agreed in pronouncing the most elaborate that had issued from the American medical press. The work was the labor of a lifetime, having been projected forty years before in the author's youth. I refer to the great work of Dr. Daniel Drake. It was entitled "A Systematic Treatise, Historical, Etiological, and Practical, of the Principal Diseases of the Interior Valley of North America, as they appear in the Caucasian, African, Indian, and Esquimaux Varieties of its Population." Its wide scope is seen from the title.

To carry out his plan of making it an original treatise, and to render it as complete as possible, Dr. Drake visited all the principal seats of our malarious diseases, his travels of observation extending from Canada to the Gulf of Florida, and from New Orleans to the sides of the Alleghenies, where those diseases cease to prevail. He prepared hydrographic maps illustrating the topography of the country; he collected one hundred tables, showing the mean temperature, winds, rain, and all that relates to the climate of the wide valley. All that he thought would interest the medical philosopher and practitioner he embodied in his book. "Here," we said, when at last his labors were concluded, "here is a work that will endure and be a treasure for all future writers and students of the diseases of America. Here is a work we are proud of, and which the profession will not willingly let die." My learned predecessor, Professor Stillé, in his report on American medical literature in 1850, said of it: "A superficial inspection of the work has convinced the committee that it belongs to the very highest rank of our medical literature, and may very probably come to be regarded as the most valuable original work yet published in America. It is certainly unrivalled in the amount and variety of its materials. Its distinguished author has raised a durable monument to his own name, and to the medical reputation not only of the great Valley, but of the greater Union."

And how stands the case with the great original work of my old master to-day? After all the years of reading, of research, of travel, of toil in constructing tables, in collecting observations, in sifting reports, what medical school in the country now refers to it

as a text-book? It is to be seen in many libraries of the country, but in most of them it is left quietly to collect dust and cobwebs. Not a few physicians, I am afraid, regard it with no greater force than a relative of mine, a very intelligent physician in Tennessee, who declared to me soon after it was published that "he wouldn't read it through for a hundred dollars." With the multitude, in truth, a big book continues still to be, what it was in the eyes of the old pagan—a great evil. Dr. Drake seems to have had a presentiment that his book would not be popular. "If," he said in his preface, "the work proves a failure as respects public favor, the author will not be without his reward, for he has found enjoyment in the labor of preparing it." He died before time had been given for testing its popularity. It will not be forgotten. It will live as a storehouse of facts, and be consulted for a long time by authors and teachers; but it was in advance of the generation for which it was written, and is not read by those for whose instruction the author expended so many years of labor.

Very similar, I apprehend, would be the appreciation by the people generally of graduates in medicine educated up to the standard of your model curriculum. In a few favored communities it is possible their stores of metaphysics and æsthetics, of geology and mineralogy, might be prized at their true value; but to the plain, common people these stores would seem little better than "loads of learned lumber." Nay, worse; for too many would conclude that a doctor who had dipped into so many arts and sciences could not have drunk deep of medicine.

When the World's Exposition was in progress at London it was affirmed by the critics that the only thing in which the Americans excelled all other people was "rugged utility." It is in the line of "rugged utility" that medicine with us has advanced with most eminent success. It is in this aspect that it is regarded with most favor by the people everywhere. But this is not the only line in which the progress of American medicine has begun to attract the attention of the world. It is developing in all directions, and producing authors of acknowledged merit as well as learned teachers and skilful surgeons and physicians.

No one who has been familiar with British medical journals for the last twenty-five years can have failed to note their altered tone in respect to the profession here. Something of this change, no doubt, is to be attributed to the power of time in allaying inveterate prejudices. These for a great while blinded our brethren

across the sea to our real merits; but the true cause of their changed tone, let us not hesitate to assert, is to be found in the improved character of our profession. Referring to "the principles and practice of medicine" in our country, Sir Henry Holland, in his charming little volume of "Recollections," says they "are derived from schools of instruction and a medical literature in no wise inferior to our own."

Set down as much as you will of this commendation to the good-nature of the amiable author, still it is the well-considered opinion of one of England's most honored physicians; and whether his countrymen generally would agree with him in the estimate or not, no one of them all would deny that, as a profession, we are every year preferring claims to higher consideration. This indeed is a fact as clear to every observer as the growth of our population, or as our advancement in the mechanic arts and all the elements of national power. Nor is this any partial movement, but an advance all along the line. It has been well compared to those grand geological changes by which continents are slowly elevated above the level of the sea. The quickening impulse is one which has been felt by the profession to its remotest extremities. The medical schools have acknowledged it, and are generally improving their processes of instruction. In most of them the lecture-term has been extended, the number of professorships has been increased, and the teaching has been rendered more demonstrative. Harvard has inaugurated a part of the system so strongly urged upon the schools, and if it is found to work well it will be universally adopted. The graduates leaving the schools, though they may know less of Greek and mathematics, are far better trained than they were formerly in clinical medicine and surgery, and are better qualified to enter upon their duties as practitioners. Almost every town in every state boasts a surgeon who will attempt lithotomy, and at every cross-roads you will find a physician conversant with physical diagnosis, and who can put up a fractured limb or reduce a dislocation. These graduates are moreover, as a class, men who read and know how to keep pace with the march of medicine. One or more of our medical journals you will find on every physician's table; and so it happens that whatever is discovered or conjectured in Great Britain or on the Continent of Europe in the spring reaches him at his remote home by the beginning of summer.

While returning from California, a year ago, in company with

a number of friends now present, the train stopped in the heart of the Rocky Mountains at a water-tank, about which had been built by laborers and miners a few frame shanties. A man in the garb of a miner entered the car, and asked if some physician on the train would not step over to his house and see a sick child? I went with him. The patient was a little boy suffering with some head trouble following measles. He was being calmed during the day by the bromide of potassium, and soothed to sleep at night by the hydrate of chloral. In the pine-board hut hard by, occupied as home and office by the doctor of the settlement, lay a medical journal of the current month, from the pages of which he gathered the latest utterances of the masters and the newest therapeutic discoveries of the day. There, in those mountain fastnesses, among that rude people a thousand miles removed from the haunts of civilization, where in his lonely rides he saw more antelopes than fellow-men, and heard oftener the shrill yelp of the coyote than the voice of a friend, this hardy pioneer in our art rendered to the sick boy of the miner the same succor that was given by his more fortunate brother to the greatest and richest denizens of the cities, to the very princes of the earth themselves.

There remains yet much to do in our educational system; nor, quoting a thought of Seneca, will the opportunity be wanting to those born after a thousand ages to add something to it. But I think it must strike you all as somewhat unaccountable that results so satisfactory as those just adverted to should flow from a system so essentially bad as ours is represented to be. Is it not something wonderful that these learned authors, these admired teachers, these safe, sagacious practitioners, should have come from schools so wanting in all the means of imparting a good medical education? That, in a word, sons so sturdy should descend from starveling parents? For we must not fail to remark that these men, of whom our country is proud, were, in very large proportion, educated at home. They are of domestic manufacture. The education of all but a few of them was commenced and completed in our own institutions.

Before sitting down I must allude briefly to another question which has occupied a portion of our time at previous meetings, and cannot with propriety be ignored here: woman's right to enter the professions; to become a member of all learned bodies; to do all that she is fitted to do.

Woman is not, as was ungallantly held by Aristotle, an imperfect man, an ill-formed imbecile being, but in development is as perfect in her sphere as man is in his. Men and women are indeed differentiated beings, one the complement of the other. Each has mental and physical peculiarities, and it is absurd to think of obliterating one class or the other by education or any possible system of training. Education will no more confer upon woman a man's physical attributes than it will give her his beard. The difference between the sexes, which is an organic one, begins to show itself in the infancy of our being. The little boy of eighteen months has tastes differing from those of his twin sister, and at this early age manifests himself an embryo man. The difference widens with the years, and attains its maximum at puberty. At a later day the divergence grows less and less, and on the down-hill of life the sexes become more assimilated again in all their moral qualities.

I shall not take up your time by a discussion of the question of the equality of the sexes. As to equality in physical strength, I believe it has never been claimed. The male in all nations, civilized and barbarous, is the larger and stronger. Anatomy as conclusively settles the question of intellectual equality. The brain of man is, on an average, larger than that of woman; and, other things being equal, size gives strength. We have Sir James Y. Simpson's authority for the statement that "there were lost in Great Britain, from 1837 to 1844, seven years, in consequence of the slightly larger size of the male than of the female head at birth, about fifty thousand lives, including those of about forty-six thousand infants, and of between three thousand and four thousand mothers who died in child-bed." So that this greater development of the male brain is attained before the child leaves its mother's womb.

But all male heads are not of greater size than the female, and it is far from being true that men are universally stronger in intellect than women. It is unjust to claim for the dominant sex universal superiority. The old school-master in "Adam Bede" declares "that there is only one thing women can do that men cannot—bear children—and that they do in a poor, make-shift sort of way. Better it had been left to men." But in this the old school-master shows himself a sorry physiologist. Woman makes a better nurse than man—how much better, all know who have experienced her gentle ministrations, but none so well as those

who when sick have been thrown upon the hands of strangers. If the hospitals and infirmaries of the earth could return the sounds which have fallen upon their walls, with what myriad echoes would they testify to her angelic qualities at the bedside of the sick and the dying! And how natural the conclusion, if better nurses, why not at least as good physicians?

In all candor I must say I am unable to find a satisfactory reason why women might not succeed in some lines of our profession. Certain paths there are which, for the honor of the sex, I hope they would not aspire to tread. General Jackson once said of his friend, James Madison, that he "could not look with composure on fields of blood and carnage." I am sure the same might be affirmed with truth of the softer sex. I trust not many would incline to surgery. Very few indeed, I think, would have the nerve to cut for stone in the bladder, or perform ovariotomy. But in tact, in grace, in gentleness, even in learning, they might presume to rival us, and with these pleasing qualities would be welcome visitors to many a sick-chamber. If young and handsome, I have no doubt valetudinarians of our sex would look for their morning calls as they might for angel visits, only that they would not have them "short and far between."

The best proof that women may make learned doctors is the fact that in times past, if medical history is to be credited, they have given to the profession some members of true erudition. Women taught side by side with men in the first medical school established in the Christian era. Of the names associated with the School of Salernum, none appear more respectable for scientific zeal and attainments than those of the three female professors, Trotula, Rebecca, and Abella, who were ready to grapple the toughest subjects in physiology or medicine. Trotula wrote a dissertation with which many here are, I suppose, well acquainted, *de Mulieribus passionibus*. And so profound was her medical scholarship that when a great disputant, Rudolph Mala Corona, went to this seat of learning to try conclusions in science with its professors, she alone was deemed by him a worthy antagonist. Her sister professor, Abella, was a poet-physician, and indited a treatise *de Atrabile, et de Natura Seminis Masculini*, in Latin verse. The taste of the learned Rebecca inclined her to the same line of investigation, and the work which has come down to our times from her pen treats *de Urina et de Embryone*.

These mothers in medicine, however, were not prolific; they

left no successors worthy of their fame, and their example has not had many imitators in the centuries since they flourished. I have strong doubts whether female physicians will ever become very numerous. Their own sex does not incline very much to them. The movement which is now startling the world by its din will probably end in no great results. But it depends on the public. What the people decree in this matter is a law to which all, we and the women alike, must bow submissively. If they want women doctors, such will be found ready to meet the demand. If those now pressing forward in their studies so eagerly, find their services are not wanted, they will take down their signs, get married—if they can—or turn lecturers, or to some more lucrative employment. I hope they will never embarrass us by a personal application for seats in this Association. I could not vote for that.

This and many other disturbing questions that may arise will be handled by you, I doubt not, with judgment and candor. Nothing, I trust, will fall out during our meeting that can impair the influence now exercised by the Association over the minds of the medical men of our country. We owe it to our professional obligations, jealously to guard its interests. It has grown to be a power in the profession, felt and recognized by all as salutary and elevating. Without any exercise of a legislative function, without the exaction of penalties, without any attempt to enforce its recommendations, it has gone quietly on, year after year, confirming its authority by wise suggestions alone. It has submitted a Code of Ethics to the profession which, accepted everywhere as law, favors order and fosters a spirit of harmony among its jarring members. Medicine is a humane and humanizing pursuit, and the Association cultivates all its ennobling tendencies. At the breaking out of our civil war, its members were seen ranged on both sides of the line. Entering heartily into the contest like men, they stood shoulder to shoulder with their neighbors; but during all the strife when a surgeon fell into the hands of the enemy he was treated by the surgeons, not as a prisoner of war, but as a brother. And when the fierce struggle was ended, and the crimson gulf that separated us was bridged over, the Association, with extended arms, invited back its sons from all the sections; and under its banner of peace they met once more as brethren. The Association is making our profession one in heart throughout our borders. May it be perpetual, and more and more a rallying point and a tower of strength for the profession over our whole wide continent!

REPORT

OF

THE LIBRARIAN.

REPORT OF THE LIBRARIAN.

LIBRARY OF THE AMERICAN MEDICAL ASSOCIATION
WASHINGTON, D.C., May 6, 1872.

MR. PRESIDENT:—

THE additions to the Library of the Association, although not commensurate with the increase of medical literature, have been considerable, and warrant the conviction that the aim of the Association to establish a "Medical Repository" of American medical works, will yet be attained.

I beg leave again to urge upon the members an increase of interest in this desirable scheme, and to suggest the advantage of placing a number of volumes of the *Transactions* of the Association in the hands of the Librarian for exchange.

The thanks of the Association are due the Regents of the Smithsonian Institution, for the careful preservation of its collection; to those who have donated to its increase; and to the Library Committee, Dr. J. M. Toner, for his earnest labors for its establishment and growth.

The accompanying catalogue will show what books, periodicals, etc., have been received since my last report. No donations of money have been made, and the inclosed account will exhibit what expenditures have been necessary.

Respectfully,
F. A ASHFORD, M.D.,
Librarian.

1330 N. Y. Av., Washington, D.C.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Address before American Medical Association	8vo. pp. 28	Henry Miller, M.D., Philadelphia, Pa.	J. L. Caball, M.D., Va.	1860.
" " American Medical Association	8vo. pp. 12	Harvey Lindsly, M.D.	" " " "	1859.
" " Graduating Class Albany Medical College.	8vo. pp. 32	A. J. Parker, LL.D.	J. M. Toner, M.D., D.C.	1851.
Address before Women's Medical College Pennsylvania.	.....	Ann Preston, M.D.	" " " "	1870.
American Med. Association, Transactions of	.....	Committee of Publication	.....	I. to XXI. inclusive.
Anæsthesia, Report to Congress.....	.....	Hon. Thurman Smith	J. M. Toner, M.D., D.C.	1858.
Anæsthesia, Report to Congress.....	.....	" " "	J. L. Caball, M.D., Va.	1858.
Anatomy.....	8vo. pp. 134	J. D. Godman	J. M. Toner, M.D., D.C.	1824.
An Answer to a Criticism by W. Gibson....	8vo. pp. 32	G. S. Patterson, Esq., Baltimore, Md.	" " " "	1820.
Anniversary Oration before New York Academy of Medicine.	8vo. pp. 7	A. C. Post, M.D.	" " " "	1849.
Anniversary Oration before New York Academy of Medicine.	.....	E. R. Peaslee, A.M., M.D.	" " " "	1859.
Annual Announcement and Catalogue University of Buffalo.	8vo. pp. 16	University	University	1871–72.
Annual Announcement University of Michigan.	.....	"	"	1871–72.
Annual Announcement Women's Medical College Pennsylvania.	.....	College	College	1850 to 71.
Annual Announcement University of Pennsylvania.	.....	University	University	1871–72.
Artificial Anus, Formation of.....	8vo. pp. 8	C. Th. Meier, M.D.	J. M. Toner, M.D., D.C.	1859.
Baths, Physiologically Explained.....	8vo. pp. 23	J. O. Reilly, M.D.	" " " "	1861.
Bistoury, The.....	Quarterly, 8vo. pp. 25	Th. S. Updegraff, M.D.	Editor	Vol. VI., 4; VII., 1, 2, 3, 4.
Biography of J. D. Godman, M.D.	12mo.pp. 24	Thos. Sewell, M.D., D. C.	J. M. Toner, M.D., D.C.	1852.
" of J. C. Otto, M.D.....	12mo.pp. 20	Isaac Parrish, M.D., Pa.	" " " "	1855.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Biography of S. L. Mitchell, M.D.	12mo.pp. 31	J. W. Francis, M.D., Pa.	J. M. Toner, M.D., D.C.	1845.
" of Dr. Linn	12mo.pp. 441	F. A. Linn and N. Sargent	" " " "	1845.
" of Dr. Samuel McClellan	8vo. pp. 23	T. W. Blatchford, M.D.	" " " "	1857.
" of Dr. J. T. Brinsmade	8vo. pp.	G. H. Hubbard, M.D.	" " " "	1859.
" of Prof. J. M. Watson, M.D.	8vo. pp. 23	W. K. Bowling, M.D.	" " " "	1866.
" of Dr. Wm. Jones	.....	J. B. Blake, M.D., Tenn.	" " " "	1867.
" of Luther V. Bell	8vo. pp. 52	I. Ray, M.D., D.C.	" " " "	1863.
" of John Delamater, M.D., LL.D.	8vo. pp. 16	W. H. Goodrich, D.D.	" " " "	1867.
" of Charles Frick, M.D.	8vo. pp. 16	Med. Profess'n, Baltimore	" " " "	1860.
" of B. V. Smith, M.D.	8vo. pp. 16	" " "	" " " "	1860.
" of Jacob Dyckman, M.D.	8vo. pp. 50	H. W. Duchachet, M.D.	" " " "	1823.
" of Thos. W. Blatchford, M.D.	8vo. pp. 58	D. Kennedy, D.D.	" " " "	1866.
" of Prof. John Locke, M.D.	.....	M. B. Wright, M.D.	" " " "	1857.
Bladon Springs, Alabama	.....	J. L. and W. P. Riddle	" " " "	1855.
Brief Medical Directions	8vo. pp. 80	A Physician	" " " "	1852.
Buffalo Medical Journal	Monthly, pp. 40	T. F. Miner, Editor	Editor	Vol. X., 8, 9, 10, 11; XI., 1, 2, 3, 4, 5, 6.
Cataract, Treatment of	8vo. pp. 26	Mark Stephenson	J. M. Toner, M.D., D.C.	1858.
Catheterism of Air Passages	8vo. pp.	Horace Green, M.D., LL.D.	J. L. Caball, M.D., Va.	1859.
Chlorosis	8vo. pp. 35	G. Robertson, M.D.	J. M. Toner, M.D., D.C.	1765.
Chloroform	8vo. pp. 32	J.Y.Simpson,M.D.,F.R.S.E.	" " " "	1848.
Cholera, Memorial to Prevent Spread of	8vo. pp. 14	John Evans	" " " "	1866.
" Report of Sanitary Commission	8vo. pp. 32	.....	" " " "	1848.
Cincinnati Lancet and Observer	8vo. pp. 64	E. B. Stephens, Editor	Editor	Vol. XIV., 4, 5, 6, 7, 8, 10, 11, 12; XV., 1, 2.
Cundurango, Secretary of State on	.....	Hon. H. Fish, Sec. State	W.B.Drinkard, M.D., D.C.	1872.
Chicago Medical Times	Monthly, 8vo. pp. 66	J. E. Hurlbut, M.D., Ed.	Editor	Vol. III., 2, 3, 4, 5, 6, 7, 8, 9, 11, 12; IV., 1.
" " Examiner	8vo. pp 63	N. S. Davis, M.D., Editor	"	Vols. X. and XI., bound; XII., 6.
Dental Journal, The Missouri	8vo. pp. 40	Homer Judd, M.D., D.D.S.	"	Vol. III., 4, 5, 6, 7, 8, 9, 10, 11, 12; IV., 12.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Dental Register	.....	J. Taft and G. Wett, Eds.	Editor	Vol. XXV., 4, 5, 6, 7, 8, 9, 10, 11; XXVI., 1, 2.
Diagrams, Showing Proportion of Children to Females, &c.	.....	J. M. Toner, M.D.	Author	1871.
Diagrams, Showing Mortality in U. S., &c...	.....	" " "	"	1871.
" " Age at which one Sex Predominates over other in different States	.....	" " "	"	1871.
Digestion, Essay on	.....	N. R. Smith, M.D., Balt.	J. M. Toner, M.D., D.C.	1825.
Eye, Littell on Diseases of	8vo. pp. 370	S. Littell, Jr., M.D.	J. L. Caball, M.D., Va.	1846.
Eclectic Medical Journal	Bi-monthly, 8vo. pp. 47	Jas. Buchanan, M.D.	Editor	Vol. VIII., 6.
Galveston Medical Journal	Monthly, 8vo. pp. 48	Greensville Dowell, M.D.	"	Vol. V., 9.
Guardian of Health	.....	Wm. M. Cornell, M.D.	"	Vol. IX., 17.
Herpetic Affections	12mo. pp. 94	Dr. Belliol	J. M. Toner, M.D., D.C.	1830.
Introductory Lecture	8vo. pp. 26	J. R. W. Dunbar M.D., Baltimore	" " " "	1837.
Introductory Lecture St. Louis Medical School.	8vo. pp. 28	M. L. Linton, M.D.	" " " "	1859.
Introductory Lecture Medical Department Columbia College, Washington, D. C.	8vo. pp. 24	J. F. May, M.D.	" " " "	1839.
Libel Suit *vs.* American Lancet	8vo. pp. 48	.....	" " " "	1831.
Lithotomy, Vesico-Vaginal	8vo. pp. 8	S. H. Tewksbury	Author	1871.
Maryland and Virginia Medical Journal	Monthly, 8vo. pp. 92	J. B. McCaw, W. C. Van Bibber, Editors	J. L. Caball, M.D., Va.	N. S., Vol. I., 1, 2, 3, 4, 5, 7, 8, 9, 10, 13.
Medico-Chirurgical Review, N. A	Bi-monthly, 8vo. pp. 160	T. G. Richardson and S. D. Gross, Editors	" " " "	Vol. I.
Medical Monthly, American	.....	E. H. Parker, J. H. Douglas, Editors.	" " " "	Vol. I., 1, 2, 3, 4, 6; XI., 2.
" Gazette, New York	Weekly	H. W. Turner, Pub., N.Y.	Publisher	Vol. V., 18; VI., 18, 19, 20, 21, 22, 23, 24, 25, 26; N. S., VII., 1, 2, 3, 4, 5, 6.
" Independent, Philadelphia, Pa	.....	Wm. Paine, M.D.	Editor	Vol. II., 13.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Medical Science and Medical Profession	8vo. pp. 35	Harvey Lindsley, M.D., Ed.	J. M. Toner, M.D., D.C.	1840.
" Provision for Railroads	8vo. pp. 47	E. S. F. Arnold, M.D.	" " " "	1862.
Mental Cultivation and Excitement.....	8vo. pp. 204	Amariah Brigham, M.D.	" " " "	1845.
Morton, Anæsthesia.....	8vo. pp. 128	Committee of Congress	" " " "	1852.
Nashville Journal of Medicine.....	.....	W. K. Bowling, M.D., W. L. Nichol, M.D., Eds.	Editors	N. S., Vol. VII., 4, 5, 6, 7; VIII., 1, 2, 3, 4, 6; IX., 2.
Naval Officers, Hints to.....	12mo. pp. 222	W. P. C. Barter, M.D.	J. M. Toner, M.D., D.C.	1830.
New York Medical Journal	.....	Edw. S. Dunster, M.D., Ed.	Editor	Vol. XIII., 4, 5, 6; XIV., 1, 3, 4, 5, 6; XV., 1, 2.
Northwestern Medical and Surgical Journal	.....	A. J. Stone, M.D., Editor	"	Vol. II., 1, 2, 3, 4, 5, 6, 7.
Oregon Medical and Surgical Reporter	8vo. pp. 106	E. R. Fiske, A.M., M.D., H. Carpenter, M.D., E. Y. Chase, M.D., Editors	"	Vol. II., 3.
Pacific Medical and Surgical Journal.....	8vo. pp. 48	Henry Gibbons, M.D., Henry Gibbons, Jr., M.D., Editors.	"	Vol. I., 5, 11, 12; II., 13, 14, 15, 17, 18, 19; IV., 41, 47, 48, 49, 51, 53, 54, 55, 56; V., 57; VII., 82; VIII., 6.
Pharmacist, The.....	Monthly, 8vo. pp. 15	N. Gray Bartlett, Editor	"	Vol. IV., 3, 4, 6, 7, 9, 10, 11, 12.
Pastor and People.....	.....	Wm. M. Cornell	.....	
Parotid Gland, Extirpation of.....	8vo. pp. 16	G. S. Pattison, M.D.	J. M. Toner, M.D., D.C.	1833.
Photo-Micrography.....	.....	J. J. Woodward, M.D., U.S.A.	" " " "	1866.
Philadelphia University Journal Medicine and Surgery.	8vo. pp. 42	J. S. Longshore, M.D., E. B. Buckman, M.D., Eds.	Editors	Vol. IV., 8, 10.
Professional Reputation. Oration.....	8vo. pp. 20	J. D. Godman, M.D.	J. M. Toner, M.D., D.C.	1826.
Proceedings of Medical Faculty of Maryland	.....	.....	" " " "	1826.
" of National Medical Convention	8vo. pp. 175	.....	J. L. Caball, M.D., Va.	1871.
" of Maine Medical Association...	.....	Association	Association	1863, 66, 67, 68, 69, 70, 71.
" of Medical Society W. Virginia	.....	Society	Society	1870.
" of Iowa State Medical Society...	8vo. pp. 272	"	"	1867.
" of New York State Med. Society	8vo. pp. 429	"	"	1870.
Reformation of Medical Science.....	8vo. pp. 58	Dr. Channing	J. M. Toner, M.D., D.C.	1839.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Report of New York Ophthalmic Hospital, Annual.	8vo. pp. 15	Mark Stephenson, M.D.	J. M. Toner, M.D., D.C.	1858.
Report of Children's Hospital District of Columbia, Annual.	.....	Board of Directors	F. A. Ashford, M.D.	1872.
Report of Massachusetts State Lunatic Hospital, 16th Annual.	.....	Trustees	.....	1871.
Report of Pennsylvania State Lunatic Hospital.	.....	.....	.....	
Report of Smithsonian Institute.....	8vo. pp. 494	Board of Regents	Institute	1870.
Richmond and Louisville Journal.....	8vo. pp. 127	E. S. Gaillard, Ed. & Prop.	Editor	Vol. XI., 4, 5, 6; XII., 1, 3, 5, 6; XIII., 1, 2.
Rules and Regulations of Wills Hospital...	8vo. pp. 32	.....	J. M. Toner, M.D., D.C.	1859.
" " " of Bellevue Hospital New York.	8vo. pp. 40	.....	J. L. Caball, M.D., Va.	1860.
Sanitary Commission.....	8vo. pp. 27	A. C. Post, M.D., W. H. Van Buren, M.D.	J. M. Toner, M.D., D.C.	1861.
Semi-Monthly Medical News, Louisville.....	.....	S. M. Bemiss, M.D., J.W. Benson, M.D., Editors	J. L. Caball, M.D., Va.	Vol. I., 21, 22, 24; II., 1, 2, 3, 4; III., 4.
Stethoscope, The, and Virginia Medical Gazette.	Monthly, 8vo. pp. 64	P. C. Gooch, A.M., M.D., Med. Soc. Va. since 1854	.....	Vols. I. & II; III., 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12; IV., V., 1, 2, 3, 4, 5, 8, 9, 10, 11, 12.
Stethoscope, The, and Virginia Medical Journal combined.	8vo. pp. 80	Drs. McCaw & Otis, Eds.	.....	Vols. VI., VII., VIII., IX., X., XI., XII., 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12; XIII., 1, 2, 3, 4, 7, 8, 9, 10, 11, 12.
Sulphuric Ether, Morton, Petition.....	8vo. pp. 46	Committee of Congress	J. M. Toner, M.D., D.C.	1849.
Surgery, Military (Chisholm).....	.....	J. J. Chisholm	J. L. Caball, M.D., Va.	1864.
Theories of Disease.....	8vo. pp. 172	Wm. Currie, M.D.	J. M. Toner, M.D., D.C.	1815.
Thyrotomy.....	8vo. pp. 30	E. Cutter, M.D.	Author	1871.
Uræmia, Induction of Labor in.....	8vo. pp. 32	S. C. Busey, M.D., D.C.	"	1871.
Utero Gravido Dissertatio Medica.....	8vo. pp. 35	G. Robertson	J. M. Toner, M.D., D.C.	1783.

Title.	Size.	Author or Publisher.	Donor.	Vol. or No.
Uterine Supports. Inquiry into Nature of and Causes of Displacements.	8vo. pp. 39	S. C. Busey, M.D., D.C.	Author	1872.
Vaccination, Evils of	12mo. pp. 88	C. C. Schieferdecker, M. D.	J. M. Toner, M.D., D.C.	1856.
" Observations on	8vo. pp. 152	J. R. Coxe, M.D.	" " " "	1802.
" and Revaccination	8vo. pp. 10	Comm. Am. Med. Assoc.	" " " "	1865.
Variola, Nature and Treatment of	8vo. pp. 35	Andrew Nebinger, M.D.	" " " "	1862.
Virginia Clinical Record	Monthly, 8vo. pp. 32	M. W. Hazlewood, Editor	.....	Vol. I., 1 to 11.
Wells, Anæsthesia	8vo. pp. 16	.....	J. M. Toner, M.D., D.C.	1870.
Wells, Anæsthesia	.....	.....	" " " "	1860.

REPORT

OF THE

COMMITTEE ON MEDICAL EDUCATION.

REPORT OF THE COMMITTEE ON MEDICAL EDUCATION.

THE prominent idea which led to the formation of the American Medical Association, was the improvement of medical education in this country. That it has not been the cause of any great advance or reform, is assuredly not the fault of the numerous committees which have been appointed on medical education; or at least it could hardly be said with fairness, that they have not pointed out in clear and unmistakable language the great evils of the present system which prevails in the United States. Many of these committees have made valuable suggestions as to improvement; but it seems much easier to show the great defects of our present system of teaching, than to devise a suitable and practicable remedy. The disease is so plain, that an error in diagnosis or prognosis can scarcely be made. To discover an antidote is more difficult—in fact so difficult, that a great many people, in and out of the profession, think that no remedy can be found, and say, that this Association, which claims to represent the medical profession of the United States, should abandon the object which called it into existence, and should resolve itself into a social body for the pursuit of pleasure under the cloak of a scientific pseudonyme. Other interested parties contend, that the Association should refer the whole subject to the medical colleges, and let them adopt such rules and regulations as suit each corps of professors in the eighty or ninety different colleges. The influence of this latter class has always been so great in the Association as to prevent its doing what it should have done long ago, viz., establishing a national standard for medical teaching, and demanding, that the colleges should accept it, or not be recognized as regular institutions by this body.

The great number of cheap so-called free medical colleges that have sprung up all over this country, in the last few years, has had

and is still having a very demoralizing influence upon the profession, the rivalry between this class of medical colleges has become so great that the fee for the diploma in some of them is relied on as the means for defraying the expenses, and paying the professors. Of course the more diplomas that are *sold*, the greater the revenue of the college. It is due to the dignity and honor of our great country that this monstrous traffic should cease. If this Association has become so thoroughly impregnated with the offspring and ideas of these institutions as to be controlled in its actions by them, the quicker it disbands, and organizes upon a different platform than that of reform in medical education, the better. Your Committee deem it entirely superfluous to rehearse the same grounds of complaint at our system, and comparison with the European plan of teaching, that have heretofore been pursued by your committees on medical education. The whole subject was reviewed in a most masterly style by President Baldwin in his inaugural address in 1869. Your Committee feel that they can add nothing to that finished production which would excite this body to action.

Last year again the erudite and distinguished Dr. Geddings (a teacher for fifty years) in a complete and exhaustive report, showed in earnest and classic language the utter demoralization of most American colleges, and the great defects of the whole system of medical teaching in this country.

Several of your reporters have presented complete analyses of the system of teaching in the different countries of Europe. These reports have all been good, and they have been received and carefully published in the *Transactions*, where they remain as so many silent monuments of the failure of this Association in accomplishing what it said it could and would do. Shall the Association take the advice of its enemies, and abandon the grand aim of its creation? Your Committee think not, and they still believe that this body will show its ability in the future to effect its object. Your Committee, while fully appreciating the great superiority of the European plan of teaching, as shown in the various previous reports that have been presented for your consideration, also recognize the fact that it is simply impossible at this time (and probably at all future times) to have the same system adopted in this country. It does not suit the genius of this people or this government. Our modes of living, and thinking even, are different from those of the old countries; and we are going too fast now to have the breaks of the old world system applied to us; conse-

quently we must seek some method that can be practically applicable to the United States. Your Committee believe, as before stated, that the great number of cheap medical colleges has been and is still a source of much evil, for the reasons, first, that the standard of graduation is almost necessarily lowered for the purpose of obtaining the diploma fee. Secondly, that very many young men who are notoriously deficient in elementary education, are induced by the reason of these low fees, and consequently low requirements for graduation, to engage in the study of medicine; and who will always remain as a dead weight for those in the profession to carry, who wish to push forward on the road of progress. And, lastly, because second and third rate talent becomes engaged in teaching. For it is evident, and reasonable to suppose, that no one who is fully competent to teach would be willing to exercise his talents for the ridiculously small fees that are received by the Professors in the majority of American Medical Colleges. The men who are engaged in this traffic tell you that they are only imitating the schools of Europe in this particular. Of course this is all the merest sophistry, and the only reply necessary is to refer you to the various reports which have been made to this body, or to any one who is familiar with the routine of the institutions of Europe.

To remedy this evil, your Committee would recommend that an appeal be addressed by this Association to the different State authorities, advising that no more charters be granted to Medical Colleges which do not agree to adopt the plan of teaching which this Association shall hereafter recommend as the guide for all Medical Colleges in this Union. Further, that when institutions already chartered fail to adopt, or fall below the standard adopted and approved by this Association, that the State authorities (acting for the good of the people) shall cause a surrender of the charters of all such institutions. Your Committee would further suggest, that the scheme of one or more National Medical Colleges, as suggested and advocated by Dr. Baldwin in his presidential address, is feasible and proper, and should be prosecuted to a successful issue. Such institutions would soon regulate medical teaching in this country, and there seems to be no good reason, why they could not be organized in such a way as to be entirely free of all political bias.

This great country certainly now occupies such a position in the eyes of the world as to demand a national standard of education.

The government itself has long recognized our low standard of medical education, and it certainly reflects no credit upon American Medical Colleges that their graduates cannot enter the army or navy without a rigid examination; so rigid, indeed, that few can pass, though they may be fresh from their college examinations. Your Committee would also recommend that, after the year 1874, no delegate be allowed a seat in this body who shall hereafter graduate at any college failing to adopt the plan of teaching which this Association shall recommend.

Your Committee would suggest, that, in lieu of the National Academy of Medicine, as recommended by Dr. S. G. Moses, of Missouri (resolutions in reference to which were referred to this Committee), this Association adopt some suitable badge, or medal, which shall be awarded its members, showing that they were deemed worthy of belonging to this representative body of American doctors. Your Committee would further urge and recommend (as has been previously suggested), that, instead of a volume of *Transactions*, as heretofore published, a monthly journal, to be called the Journal of the American Medical Association, be established under the auspices of this body. That one or more editors of such journal be annually elected by this Association. The great object of this journal, besides publishing the transactions, and such papers as the Association should order published, should be reform and advancement in Medical Education. It is confidently believed that not only the profession but also the people would be influenced by this means. It would be read by thousands in and out of the profession, who never see our *Transactions*. It would also be a great stimulant to the members of the Association, and a great many more would furnish valuable papers, who do not do so now, for the reason that the circulation of the *Transactions* is limited, and they prefer to publish in medical journals.

Your Committee would earnestly insist that this Association take immediate and decided action, so as to make itself felt as the head of the profession of the United States. It must act quickly, or it will be powerless; for, as a professor in a cheap medical college boasted some time since, "that they would soon be able to control the profession in his State by means of their own graduates." So, in the same way, if this Association pursues the same course that it has for the last few years, it will be governed by the same kind of material.

The Association should establish a standard of education, and

one for membership, and the standard should never be lowered, but advanced as rapidly as possible, until the profession of this land is on a par with that of any other country. When the Association does this, it will be on the road to the guidance and government of the profession in America, and not before. For, as Dr. Geddings well remarks, "there is an inborn disposition in man which prompts him to rise." And if this Association establishes a standard of membership, and publishes to the world, that colleges and their graduates who do not observe certain rules shall not be deemed worthy of membership in this representative body, we would soon see a most desirable change.

Your Committee would suggest that a Special Committee be appointed to report at this present meeting upon the various suggestions offered, except in reference to teaching, and that, according to the idea of Dr. Geddings (modified somewhat as to details), a congress composed of two members from each State and Territory and one from each recognized Medical College, all to be members of this Association, be appointed (or nominated by the Nominating Committee) at this present session. That said committee, or congress, shall meet three days previous to our next annual meeting, and that said committee, or congress, shall perfect a plan for some uniform system of medical teaching, which, when adopted by the Association, shall be the only recognized method of medical teaching in the United States.

All of which is respectfully submitted.

J. S. WEATHERLY, *Chairman*,
J. M. TONER.

REPORT

OF THE

COMMITTEE ON MEDICAL LITERATURE.

REPORT OF THE COMMITTEE ON MEDICAL LITERATURE.

THE Chairman of the Committee on Medical Literature addressed a letter to each of his four associates, asking suggestions as to the report, and any contributions thereto they were willing to make.

Two of the gentlemen replied, Dr. Carpenter, of Oregon, and Dr. Garvin, of Rhode Island. The former wrote that he had nothing of special interest to communicate; the letter from Dr. Garvin I will present as an appendix to the report, and heartily commend the excellent suggestions therein made to professional attention.

The duties of the Committee on Medical Literature, as defined twenty-five years ago, have now become, with the marvellous increase of that literature, impossible of accomplishment, and even were they faithfully and fully accomplished, the utility of the toil might well be questioned. Let me remind you that this Committee is "to prepare an Annual Report upon the general character of the periodical Medical Publications of the United States in reference to the more important articles therein presented to the profession, on Original Medical Publications, on Medical Compilations, and Compends by American writers, on American Reprints of Foreign Medical Works; and on all such means as may be deemed advisable for encouraging and maintaining a national literature of our own."

To prepare such a report would require more than a year's leisure, more than any half dozen men's learning; its reading would occupy more than the three days of our annual session, and its publication would bankrupt our Treasury beyond the hope of recovery: the task of Sisyphus were a trifle in comparison with such a labor.

It is proposed, however, to make some brief observations as to

our national medical literature, and some suggestions in reference to means for its increase and improvement.

And first, we have a professional literature which challenges the respect of the just and intelligent abroad, and of which every American physician should be proud. This very city in which our twenty-third annual meeting is held, and which is endeared to so many of us as the place of our medical instruction, has produced works on Anatomy, Surgery, Theory and Practice of Medicine, Diseases of Women, Diseases of Children, Materia Medica and Therapeutics, Obstetrics, Medical Chemistry, and Medical Jurisprudence, besides various Special Treaties and Monographs, that would make quite a library of themselves; nay, without which no medical library, however vast and various its accommodations, would be complete. Philadelphia has had her long line of illustrious teachers and authors, chief among the founders and supporters of American Medical Literature, and who have borne afar, wherever the science of medicine is known, the glory and honor of the American name. It can give rise to no insidious thought in any just mind. if the names of four of these living authors—four who have probably contributed more to our professional literature than any four others upon the continent—whose fame is not of Philadelphia, or even of America, but of the whole medical world —should be mentioned: I mean Dr. George B. Wood, Dr. Hugh L. Hodge, Dr. Isaac Hays, and Dr. Samuel D. Gross.

The productions of these men, many of those productions republished in foreign countries, would be a sufficient answer to the ungracious remarks of a British periodical seventeen years ago: "Our transatlantic offspring reprint, translate, and pirate the medical works of other nations, but they produce little of their own."

But, at any rate, such a remark would hardly be made now, for the hearty recognition of the value of our medical literature by such journals as the London *Medical Times and Gazette*, and by such eminent men as Sir Henry Holland, would condemn it at once alike as an injustice and a folly.

Probably the works by American physicians and surgeons are more numerous than would be imagined by those who have not investigated the subject. Consult the catalogues of the four chief medical publishers in the United States, and it will be found that one-third of the entire number of books published are of American authorship. Ten years hence, with the wonderful activity which

now pervades the medical mind, with the growth of our great cities and hospitals, and the increase of the reading members of our profession, their proportion will increase in favor of home production, and probably the day is not very distant when the great majority of books on the counters and shelves of our booksellers and in the offices of our physicians shall be from American pens.

In regard of the character of the published transactions of our State medical societies, and of medical journals, it is gratifying to observe a steady improvement. Not only is the number of these increasing, but also that of contributors, and the average character of the contributions is better from year to year. Undoubtedly many papers find their way to the light which are mere "rehashes" of material already familiar to the profession; others that are lame in logic, rambling in rhetoric, and with errors in syntax that would discredit school-boys in round-shirts, or school-girls without trails or chignons: nevertheless the good is superior to the evil, and blessed be even the merciless critic who, while honoring the former, faithfully exposes the latter with the design and with the result of accomplishing the persistence of silence, or of reformation.

In this country we have not the facilities for original investigations, for physiological or chemical researches, which are offered in Europe; nor is the American mind of the present age characterized by that patient and studious nature requisite for such investigations. Keen, quick, practical—soon wearying with that which does not bear early fruit, whether in speculative thought or experimental investigations—that mind tolerates no alliance with even a suspected barren virgin, whether of the laboratory or of the study.

Our literature generally, too, is practical in character, plain and direct in expression. We boast, indeed, the grace and beauty with which Dr. Chapman clothed his thoughts, grace and beauty that have never been excelled by any American medical writers; the flashing decorations and brilliant rhetoric of the late Dr. Meigs, the calm, dignified, and often ornate periods of Dr. Wood; and so, too, of some others; but generally our American authors give less heed to language, than to ideas, and only endeavor to utter their thoughts clearly, plainly, it may be briefly—for the American doctor is a man of business—he hurries because the age hurries, he hurries because the necessities of daily life compel him, and if an author wishes to catch his ear, he must have something useful to say, and say it clearly and quickly.

The question of an international copyright law with Great Britian has been mooted at some of the meetings of the Association; and this question derives fresh interest, if not importance, from the recent agitation of the subject in England—only a few days ago a petition for the securing of such a law with the United States was presented to the British government, signed not only by eminent men in our own profession, but also by such men as Carlyle, Mill, Huxley, and Rankin.

In 1859 a committee, consisting of Drs. Wood and Hays, presented to the Association a memorial prepared for presentation to Congress, advocating the establishment of such a law. Undoubtedly a law of this kind would be just; nay, its absence seems a gross injustice; nevertheless, that absence has secured to American physicians much cheaper copies of transatlantic publications than they could otherwise have; and the American publishers have not acted so illiberally towards the authors as many suppose—they are not the pirates they have been pictured under the inspirations of vivid fancy—they have often, if not generally, paid those authors for advanced sheets of their works, or, if not the authors, at least their publishers.

But does the republication of foreign works hinder the issuing of American? To some degree undoubtedly, but this is not the fault, or the chief fault, of the publisher, but of the profession, who in many instances will take a work from a foreign author when they might have an equally good or better one from an American pen.

There are to-day publishers who would much rather issue an American book than a reprint; for the former is their own, while the latter may be simultaneously issued by a rival house, and the market thus so flooded that profits or even compensation would be impossible.

It may be asserted that the remuneration paid to our medical authors is usually very small; but this is not a truth peculiar to this country; *dat Galenus opes* never meant that doctors would make money by writing books. Nevertheless, the revenue, generally percentages upon sales, coming to a medical author from his books must increase with the increase of doctors, and especially of students among them; the latter increase being as undoubted as the former.

But, at any rate, mere money as a stimulus to intellectual exertions has never, in other departments of literature, given the world

its richest treasures, its noblest works; the immortal words of poets have been uttered under the mighty inspiration of genius, or else to win earth's most unfading crowns, and prophet-teachers and philanthropists have spoken only hoping that their loving utterances of kind instruction and of wisdom might fall in golden showers upon a common humanity. And shall those qualified by large experience and profound study to instruct in the noblest of all earthly professions, whose words are for the healing of the nations, wait in silence for the rustle of greenbacks, or the ring of gold, and haggle with publishers for more liberal terms, when they know aught that will help their toiling professional brethren, and lift, or even lighten, the cross of suffering under which their fellow-beings groan? A man must do the best he can, not merely for himself and for his family, but for his age and for his race; and when, in the eager struggle for paltry wealth or transitory professional positions, giving to self what was meant for mankind, he neglects a higher usefulness and is deaf to the voice of opportunity, he is little wiser, little better, than Ulysses when called to the siege of Troy, ploughing sand and sowing salt.

Some have regarded the establishment of a national medical journal, taking the place of our annual volume of *Transactions*, and similar in character to the *Journal of the British Medical Association*, as an important means of advancing our Medical Literature.

Each year about six hundred copies of these *Transactions* are issued, and probably half of the six hundred find faithful readers. Ought not this Association to speak to a far larger audience? Ought it not to wield a far greater power than it can when there are so few to know its utterances? Then, too, a voice once a year soon loses its most distant echo, and its most vivid impress upon the mind is soon trodden out under the hurrying footsteps of new thoughts; a year is a long time in this age, when we travel so quickly from the gateway of the day to the land of the setting sun, when continent whispers beneath ocean to continent, and science has bound the earth in a net-work of iron. Better than the ponderous annual volume, which passes into the hands of a few hundred, would be a weekly, a semi-monthly, or even a monthly, addressing its thousands with words of instruction and guidance. Such a journal would have the effect of consolidating the profession of the entire country, of uniting them in a community of thought and action. A medical journal may be established to promote the interests of a publisher or of a bookseller, or of a college, or of an

individual. Now this is quite legitimate when the interests referred to coincide with those of the profession; when the readers receive the full worth of their subscriptions. But a journal, if there be such an one, which resorts to unmerited praise of the publications of the house issuing it, and unjust condemnation of those of a rival; a medical journal which lauds the Faculty of the college whose interests it was instituted to promote, resorting to the arts by which quack medicines are advertised to a credulous public, does no honor and no good to the profession, and ought to die. So, too, a medical journal may become insensibly tinctured by the special atmosphere which surrounds it; local influences may mould its character, and local interests control its conduct; in a word, it becomes provincial. It is believed, we have a journalistic literature that does honor to the American profession; and yet the perils that have been alluded to do exist. And possibly, too, the best ideal of a medical journal has not yet been obtained, has not yet been developed with the actual. Such a journal should be eminently practical in character; it should represent the highest standard of criticism and of literary taste; it should be fully abreast with all progress in pathology and therapeutics; it should minister to the larger culture of the physician, intellectual, moral, and æsthetic, making him a broader and nobler man, not a mere giver of drugs, but a priest and teacher, training all to a higher life, and he himself daily illustrating the kindness and the courtesy, the grace and the nobleness, of a gentleman. Now, might not such an ideal be realized through the influence and efforts of the Association?

Undoubtedly the fact of its being under editorial supervision would secure advantages and expose it to dangers, from which our *Transactions* are exempt. In the opinion of many, communications have sometimes appeared in those *Transactions*, which would be rejected by nine out of ten of medical editors: and a rejection would be sure of occurrence when communications came into the hands of the editor of this journal of the Association, even though they had successfully passed the ordeal, frequently hurried, or otherwise imperfect, of one of the sections. On the other hand, possibly some whose communications should be rejected would become indignant at the fancied injustice of their treatment; but the good sense of the great mass of the profession ought to furnish a basis firm enough for such an enterprise to rest upon, undisturbed by these temporary storms. The editorial chair would not be a

sinecure: it should be held by one who would neither shrink from thorns, nor shiver at thunder; he should be at once intelligent, conscientious, and fearless; and the elements of character thus suggested, combined in an individual, insure him ultimate success.

Such a journal would not interfere in the least with any good medical periodical; these would live because they had grown strong, and were needed; some would be continued to some extent as the representatives of local interests.

In 1868, the late Dr. Chas. A. Lee, in his report upon Medical Literature, urged, as one of the means of promoting that literature, the establishment of a society similar to the Sydenham Society of Great Britain, who should examine manuscripts, and publish such as were meritorious. The suggestion has an earlier date—it was originally made by Dr. John P. Harrison, reporting upon Medical Literature, in 1849—and, with other suggestions made by the reporter, was made the subject of consideration by a special committee, consisting of Drs. Horner, Condie, and Hays, who presented their views to the Association in 1850, and their argument against the proposition seems conclusive.

It is doubtful whether such an organization is now at all needed, for there are American publishers who would readily issue books whose character, or the reputation of whose authors, would insure their ready sale.

Possibly the American Medical Association might have a permanent editorial committee, of men well qualified for the work and well-known and respected by the profession; and to this committee might be presented all book-manuscripts, for their critical examination; that examination resulting in a favorable decision as to the merits and usefulness of the volume, there would probably be no great difficulty in finding a publisher, and let it when issued bear the inscription of, "Published under the auspices of the American Medical Association;" and having this inscription it would almost certainly meet with successful sale.

Furthermore, allow me to suggest that it might be expedient for the Association, instead of the two annual prizes of $100 for essays, to give a triennial prize of $600 to the author of the best work in surgery, or in medicine, published within three years.

In order to secure at least one important and attractive paper in each of the several sections, it might be well to have the chairman of each section to deliver an address, embracing, or at least relating to, the subjects properly coming before the body over which he

presides. Such an address ought not to exceed an hour, and probably it would be better to limit it to thirty or forty-five minutes; for one of the evils of some of the papers presented to the sections has been their interminable longitude, if not indefinite latitude—prosy and prolix, read in a dreary, weary monotone, such a paper may tire the most patient, and even compel the abrupt withdrawal of the most polite to prevent their sleeping.

Again let me remind you that a Committee on Medical Literature, however needed a quarter of a century ago, and whatever usefulness it has accomplished in that period given, does not seem to the writer to be at this time a necessity, nor, indeed, in reference to the duties assigned to it, even a possibility. I would, therefore, respectfully suggest the abolition of this from among the Standing Committees of the Association, or else assigning to it a much more restricted sphere of operation.

THEOPHILUS PARVIN.

Works Recently Published in the United States.

Works marked with an asterisk [*] are reprints, with an obelus [†] are translations, and those without any marks are original American works.

Arthur.—Treatment and Prevention of the Decay of the Teeth. By R. Arthur. 16mo. Illustrated. Philadelphia: J. B. Lippincott & Co.

*Attfield.—Chemistry; General, Medical, and Pharmaceutical, including the Pharmacopœia of the United States. From the second and enlarged London edition. By J. Attfield. 12mo. Philadelphia: H. C. Lea.

*Allingham.—Fistula, Hæmorrhoids Painful Ulcer, Stricture, Prolapsus, and Other Diseases of the Rectum By W. Allingham, M.D. 8vo. Illustrated. Philadelphia: Lindsay & Blakiston.

*Anstie.—Neuralgia and Diseases that Resemble it. By F. E. Anstie, M.D. 12mo. New York: D. Appleton & Co.

Ashhurst.—The Principles and Practice of Surgery. By J. Ashhurst, M.D. 8vo. Illustrated. Philadelphia: H. C. Lea.

*Allen.—Aural Catarrh; or, the Commonest Forms of Deafness and their Cure. By Peter Allen, M.D. 12mo. Illustrated. New York: William Wood & Co.

*Beale.—Life Theories; their Influence upon Religious Thought. By L. S. Beale. 12mo. Colored Plates. Philadelphia: Lindsay & Blakiston.

*Bennett.—On the Treatment of Consumption, by Hygiene, Climate, and Medicine. By J. Henry Bennett. Second edition. 8vo. New York: D. Appleton & Co.

Bright.—Cancer; its Classification and Remedies. By J. W. Bright, M.D. 8vo. Philadelphia: S. W. Butler.

*Chambers.—Restorative Medicine. Harveian Oration, 1871. With Two Sequels. By T. K. Chambers, M.D. 16mo. Philadelphia: H. C. Lea.

Cutter.—A Contribution to the Treatment of the Versions and Flexions of the Unimpregnated Uterus. By Ephraim Cutter, M.D. 8vo. Illustrated. Boston: James Campbell.

Dalton.—A Treatise on Human Physiology; Designed for the Use of Students and Practitioners of Medicine. By Jno. C. Dalton, M.D. Fifth edition, Revised and Enlarged. 8vo. Philadelphia: H. C. Lea.

*Dillnberger.—Handy Book of Women and Children's Diseases, according to the Vienna School of Medicine. By E. Dillnberger, M.D. 12mo. Philadelphia: Lindsay & Blakiston.

*Duncan.—Fecundity, Fertility, and Sterility, and Allied Topics. By J. Matthews Duncan, M.D. Second edition, revised and enlarged. 8vo. New York: William Wood & Co.

Elwell.—A Medico-Legal Treatise on Malpractice and Medical Evidence, Comprising Elements of Medical Jurisprudence. By J. J. Elwell, M.D. Third edition, revised and enlarged. 8vo. New York: Baker, Voorhies & Co.

*Flower.—Diagrams of the Nerves of the Human Body; Exhibiting their Origin, Divisions, and Connections, with their Distribution to the Various Regions of the Cutaneous Surfaces and to all the Muscles. By W. H. Flower. Edited with additions by Wm. W. Keen, M.D. 4to. Philadelphia: Turner Hamilton.

*Fothergill.—Digitalis: its Action and its Use. By J. M. Fothergill, M.D. 12mo. Philadelphia: Lindsay & Blakiston.

Flint.—On the Physiological Effects of Severe and Protracted Muscular Exercise; with Special Reference to its Influence upon the Excretion of Nitrogen. By Austin Flint, Jr., M.D. 8vo. New York: D. Appleton & Co.

*Fox.—Skin Diseases; their Description and Pathology, Diagnosis and Treatment. By Tilbury Fox, M.D. Edited by (with the sanction of the author) M. H. Henry, M.D. 8vo. Illustrated. New York: William Wood & Co.

*Gantillon.—Uterine Catarrh frequently the Cause of Sterility. By H. E. Gantillon, M.D. 8vo. Boston: James Campbell.

*Green.—An Introduction to Pathology and Morbid Anatomy. By T. H. Green, M.D. 8vo. Illustrated. Philadelphia: H. C. Lea.

Hammond.—A Treatise on Diseases of the Nervous System. By W. A. Hammond, M.D. 8vo. Illustrated. New York: D. Appleton & Co.

Hamilton.—A Treatise on Fractures and Dislocations. By F. H. Hamilton, M.D. Fourth edition, revised and improved. 8vo. Illustrated. Philadelphia: H. C. Lea.

Holden.—The Sphygmograph and Physiology of the Circulation. By E. Holden, M.D. 8vo. Illustrated. New York: William Wood & Co.

†Henry.—The Modern Treatment of Syphilis. With about Two Hundred Formulæ of the Vienna Cliniques. Translated by M. H. Henry, M.D. 8vo. New York: William Wood & Co.

Howe.—Emergencies and How to Treat Them. The Etiology, Pathology, and Treatment of the Accidents, Diseases, and Cases of Poisoning which demand Prompt Attention. By Jos. W. Howe, M.D. 8vo. New York: D. Appleton & Co.

*Harley.—The Urine and its Derangements; with the Application of Physiological Chemistry to the Diagnosis and Treatment of Constitutional as well as Local Diseases. By G. Harley, M.D. 12mo. Illustrated. Philadelphia: Lindsay & Blakiston.

Hewson.—Earth as a Topical Application in Surgery. By A. Hewson, M.D. 12mo. Philadelphia: Lindsay & Blakiston.

Jefferies.—Diseases of the Skin: the Recent Advances in their Pathology and Treatment. (Boylston Prize Essay, 1871.) By B. Joy Jefferies, M.D. 12mo. Boston: Alex. Moore.

*Legg.—A Guide to the Examination of the Urine. By J. Wickersham Legg, M.D. 16mo. Philadelphia: Lindsay & Blakiston.

Logan.—Consumption: its Pathology and Treatment, to which is added an Essay on Alcohol in the Treatment of Consumption. By W. M. Logan, M.D. 12mo. Philadelphia: S. W. Butler.

*Mackenzie.—Essays on the Growths of the Larynx; with Reports and an Analysis of Three Hundred Cases. By M. Mackenzie, M.D. 8vo. Illustrated. Philadelphia: Lindsay & Blakiston.

*Meadows.—A Manual of Midwifery. By A. Meadows, M.D. Second edition. 12mo. Philadelphia: Lindsay & Blakiston.

†Niemeyer.—A Text-Book of Practical Medicine, with Particular Reference to Physiology and Pathology. By Felix Niemeyer. Revised edition. 2 vols. 8vo. New York: D. Appleton & Co.

†Neumann.—Hand Book of Skin Diseases. By Isidor Neumann. Translated with Notes by L. D. Bulkley, M.D. 8vo. Illustrated. New York: D. Appleton & Co.

Ray.—A Treatise on the Jurisprudence of Insanity. By Isaac Ray, M.D. Fifth edition with additions. 8vo. Boston: Little, Brown & Co.

*Ringer.—A Hand Book of Therapeutics. By Sydney Ringer, M.D. Second edition. 8vo. New York: William Wood & Co.

*Reynolds.—A System of Medicine. By J. Russell Reynolds, M.D. Vol. 3. Containing Local Diseases (Continued). 8vo. Philadelphia: J. B. Lippincott & Co.

*—— Lectures on the Clinical Use of Electricity. By J. Russell Reynolds, M.D. 12mo. Philadelphia: Lindsay & Blakiston.

†Rindfleisch.—An Introduction to the Study of Pathological Anatomy. By E. Rindfleisch, M.D. Translated from the Second German edition by Wm. C. Kloman, M.D., assisted by F. T. Mills, M.D. 8vo. Philadelphia: Lindsay & Blakiston.

*Simpson, Sir J. Y.—Selected Obstetrical and Gynæcological Works Containing the subject of his Lectures on Midwifery. Edited by J. Watt Black, M.D. 8vo. New York: D. Appleton & Co.

*—— Anæsthesia, Hospitalism, and other papers. Edited by Sir W. G. Simpson, Bart. 8vo. New York: D. Appleton & Co.

*—— Clinical Lectures on the Diseases of Women. Edited by A. R. Simpson. 8vo. New York: D. Appleton & Co.

*Sansom.—The Antiseptic System: a Treatise on Carbolic Acid and its Compounds. By E. Sansom, M.D. 8vo. Philadelphia: J. B. Lippincott & Co.

*Stewart.—A Practical Treatise on Bright's Disease of the Kidneys. By T. Grainger Stewart. Second edition. 8vo. New York: William Wood & Co.

*Tanner.—A Practical Treatise on Diseases of Infancy and Childhood. By T. Hawkes Tanner, M.D. Second edition. 8vo. Philadelphia: Lindsay & Blakiston.

*—— Memoranda on Poisons. By T. Hawkes Tanner, M.D. Third and Completely revised edition. 32mo. Philadelphia: Lindsay & Blakiston.

*—— Practical Midwifery and Obstetrics: Including Anæsthetics. By J. Tanner, M.D. 16mo. Philadelphia: J. B. Lippincott & Co.

*Trousseau.—Lectures on Clinical Medicine delivered at the Hotel Dieu, Paris. By A. Trousseau. Vol. IV. Translated from the third revised and enlarged edition, by J. Rose Cormack. 8vo. Philadelphia: Lindsay & Blakiston.

Turnbull.—A Clinical Manual of the Diseases of the Ear. By Laurence Turnbull, M.D. 8vo. Philadelphia: J. B. Lippincott & Co.

Thomas.—Practical Treatise on the Diseases of Women. By T. G. Thomas, M.D. Third edition, enlarged and thoroughly revised. 8vo. Philadelphia: H. C. Lea.

*Waring.—Practical Therapeutics: Considered Chiefly with Reference to the Articles of the Materia Medica. By E. J. Waring, M.D. From the third London edition. 8vo. Philadelphia: Lindsay & Blakiston.

*West.—On Some Disorders of the Nervous System in Childhood. By Charles West, M.D. 16mo. Philadelphia: H. C. Lea.

Wythes.—The Physician's Pocket Dose and Symptom Book; containing the Doses and Uses of All the Principal Articles of the Materia Medica. By Jos. Wythes, M.D. Tenth edition. 24mo. Philadelphia: Lindsay & Blakiston.

*Williams.—Pulmonary Consumption: its Nature, Varieties, and Treatment. By C. J. B. Williams, M.D., and C. T. Williams, M.D. 8vo. Philadelphia: H. C. Lea.

Van De Warker.—The Detection of Criminal Abortion and the Study of Fœticidal Drugs. By Ely Van De Warker, M.D. Illustrated by Pulse Tracings of the Sphygmograph. 8vo. Boston: James Campbell.

The Clinic. Jas. T. Whittaker, M.D., Editor. Cincinnati, Ohio. Weekly.

Chicago Medical Journal; a Monthly Record of Medicine, Surgery, and Collateral Science. J. Adams Allen, M.D., and Walter Hay, M.D., Editors. Chicago, Illinois.

The Medical and Surgical Reporter; a Weekly Journal. S. W. Butler, M.D., Editor. Philadelphia.

The Cincinnati Lancet and Observer. E. B. Stevens, M.D., Editor; J. A. Murphy, M.D., W. H. Mussey, M.D., and E. Williams, M.D., Associate Editors. Cincinnati, Ohio. Monthly.

Atlanta Medical and Surgical Journal. J. P. Logan, M.D., and W. F. Westmoreland, M.D., Editors. Atlanta, Georgia. Monthly.

Philadelphia Medical Times; a Semi-monthly Journal of Medical and Surgical Sciences. Philadelphia, Pennsylvania.

The Boston Medical and Surgical Journal. Francis H. Brown, M.D., Editor. Boston. Weekly.

The Journal of the Gynæcological Society of Boston; a Monthly Journal devoted to the Advancement of the Knowledge of the Diseases of Women. Winslow Lewis, M.D., H. R. Storer, M.D., and Geo. H. Bixby, M.D., Editors. Boston.

The New York Medical Journal. J. B. Hunter, M.D., and W. T. Lusk, M.D., Editors. New York. Monthly.

The Journal of Psychological Medicine; a Quarterly Review of the Diseases of the Nervous System, Medical Jurisprudence, and Anthropology. W. A. Hammond, M.D., Editor. New York.

Detroit Review of Medicine and Pharmacy; a Monthly Record of Medical, Surgical, and Scientific Progress. Geo. P. Andrews, M.D., Editor; Lartus Connor, M.D., and Albert B. Lyons, M.D., Associate Editors. Detroit, Michigan.

Michigan University Medical Journal. Conducted by the Faculty of the Medical Department. Henry S. Cheever, M.D., Preston B. Rose, M.D., Albert B. Prescott, M.D., Geo. E. Frothingham, M.D., Managing Editors. Ann Arbor, Michigan. Monthly.

The Journal of Materia Madica. Devoted to Materia Medica, Pharmacy, and Chemistry. Conducted by Joseph Bates, M.D., and H. A. Tilden. New Lebanon, New York. Monthly.

Nashville Journal of Medicine and Surgery. W. K. Bowling, M.D., and W. L. Nichol, M.D., Editors. Nashville, Tennessee. Monthly.

American Journal of Insanity. Jno. P. Gray, M.D., Editor; Judson P. Andrews, M.D., Walter Kempster, M.D., Daniel H. Kitchen, M.D., Assistant Editors. Utica, New York. Quarterly.

Half-Yearly Compendium of Medical Sciences; a Synopsis of the American and Foreign Literature of Medicine, Surgery, and the Collateral Sciences for Six Months. S. W. Butler, M.D., and D. G. Brinton, M.D. Philadelphia, Pennsylvania.

The American Journal of Obstetrics and Diseases of Women and Children. B. F. Dawson, M.D., Editor. New York. Quarterly.

Leavenworth Medical Herald and Journal of Pharmacy. J. W. Brock, M.D., and T. Sinks, M.D., Editors of Medical Department; and Robert J. Brown, Editor of Pharmacy Department. Leavenworth, Kansas. Monthly.

The American Practitioner. David W. Yandell, M.D., and Theophilus Parvin, M.D., Editors. Louisville, Kentucky. Monthly.

The American Journal of the Medical Sciences. Isaac Hays, M.D., Editor. Philadelphia. Quarterly.

The Medical News and Library. Philadelphia. Monthly.

The Medical Record. A Semi-monthly Journal of Medicine and Surgery. Geo. F. Shrady, M.D., Editor. New York.

New Remedies. A Quarterly Retrospect of Therapeutics, Pharmacy, and Allied Subjects. Horatio C. Wood, Jr., M.D., Editor. New York.

The Cincinnati Medical News.

The Kansas City Medical Journal. E. W. Schauffler, M.D., Editor.

Northwestern Medical and Surgical Journal. St. Paul, Minnesota.

Southern Medical and Surgical Journal. Augusta, Georgia.

Southern Journal of Medical Sciences. New Orleans, Louisiana.

Oregon Medical and Surgical Journal. Salem, Oregon.

Buffalo Medical and Surgical Journal. Julius F. Miner, M.D., Editor. Buffalo, New York. Monthly.

The Western Lancet. A Monthly Journal devoted to Medicine, Surgery, and the Collateral Sciences. Eustace Trenor, M.D., and Heman P. Babcock, M.D., Editors. San Francisco, California.

The Pharmacist and Chemical Record. A Monthly Journal of Pharmacy and the Collateral Sciences. N. Gray Bartlett, Editor. Chicago, Illinois.

The New Orleans Journal of Medicine. New Orleans, Louisiana. Quarterly.

The American Journal of Pharmacy, Published by Authority of the Philadelphia College of Pharmacy. J. M. Maisch, Editor. Philadelphia, Pennsylvania. Monthly.

The Richmond and Louisville Medical Journal. Louisville, Kentucky. Monthly.

The American Journal of Syphilography and Dermatology; a Quarterly Review; devoted to the Consideration of Venereal and Cutaneous Diseases, etc. M. H. Henry, M.D., Editor. New York.

Western Medical Advance and Progress of Pharmacy. An Illustrated Quarterly Journal. W. H. Lathrop, M.D., Editor. Detroit, Michigan.

Pacific Medical and Surgical Journal. Henry Gibbons, M.D., and Henry Gibbons, Jr., M.D., Editors. San Francisco, California. Monthly.

The Western Retrospect of Medicine and Surgery. H. M. Harvey, M.D., H. A. Lewis, M.D., and M. M. Newell, M.D., Editors. Evansville, Indiana. Monthly.

The Medical Examiner. A Semi-monthly Journal of Medical Sciences. N. S. Davis, M.D., and F. H. Davis, M.D., Editors. Chicago, Illinois.

The Druggist's Circular and Chemical Gazette. A Practical Journal of Chemistry as applied to Pharmacy, Arts, and Sciences, etc. L. V. Newton, M.D., Editor. New York. Monthly.

The American Chemist. A Monthly Journal of Theoretical, Analytical, and Technical Chemistry. Chas. F. Chandler, Ph.D., and Wm. H. Chandler, Editors. New York.

Archives of Ophthalmology and Otology. Edited and Published Simultaneously in English and German. Prof. H. Knapp, M.D., in New York; and Prof. S. Moos, M.D., in Heidelberg, New York. Two Numbers to a Volume.

REPRINTS.

The Half-Yearly Abstract of the Medical Sciences. Being an Analytical and Critical Digest of the Principal British and Continental Medical Works Published in the Preceding Six Months. Philadelphia.

The Practitioner; a Monthly Journal of Therapeutics. Francis E. Anstie, M.D., Editor. Baltimore, Maryland.

The London Lancet. A Journal of British and Foreign Medicine, Physiology, Surgery, Chemistry, Criticism, Literature, and News. Jas. G. Wakeley, M.D., Editor. New York. Monthly.

Braithwaite's Retrospect of Practical Medicine and Surgery. Being a half-yearly Journal. W. Braithwaite, M.D., and Jas. Braithwaite, M.D., Editors. New York.

APPENDIX.

LONSDALE, R. I., March 26, 1872.

DEAR DOCTOR:—

Your invitation to contribute something for the report upon Medical Literature was duly received.

Not being acquainted with the ground which has been traversed in previous reports, I, as the junior member of the Committee, might as well perhaps keep silent; but since I have a sincere desire to see our literature of more permanent value than is at present the case, I will mention a few points which I deem essential to such an end.

Our Committee, like the American Medical Association itself, has no means of enforcing its opinions, it can only recommend. Medical journals, like other periodicals, are independent of each other, and of all supervision of the profession at large, except so far as any one member of the medical faculty is influenced by the animus of the entire body.

Any suggestions, therefore, on our part, must aim to be practical. We must not only indicate what it is desirable to accomplish, but also show *how* it may be done. Please introduce the few points I may make into your report, provided they meet with your approbation, in whatever form you prefer.

Yours truly,

L. F. C. GARVIN.

REFORMS IN MEDICAL JOURNALISM.

1. The report of successful cases only.

2. The introduction of new drugs or of new methods of treatment by *individuals*.

3. Single or classified facts and conclusions based only upon memory.

1. The report of cases selected from a larger number because the result was favorable, does harm by giving a partial and misleading view of the subject under consideration.

2. The introduction of new drugs, or the proposal of new uses for old ones, ought not to be admitted upon the testimony of a single individual. The number of specifics is so small that the presumption is always against their discovery, however sanguine or even eminent the proposer may be. He should first submit his new idea to

trial by the members of the local society to which he belongs; and they, as a body, should be the authority upon which it is given to the profession at large. The introduction of cundurango is a notable, but by no means singular, example of the transgression of this principle. The evils which have sprung from its unsupported presentation, though appreciated by us all, are really beyond estimate.

3. All reports, whether they consist of many consecutive cases from a single member of the profession, or whether, better still, they be an authoritative statement from a society, should be based upon *written records*. Causes, symptoms, prescriptions, results ought to be faithfully committed to paper upon the very day of their occurrence, and upon these alone the estimates should be made. Crystallizations of experience as retained in the memory do much towards making a successful practitioner, but as a basis of printed instruction for others are of comparatively little value.

CONCLUSION.—The attainment of these desired reforms can only be through the force of professional opinion as exhibited:—

1. By the action of societies in their condemnation.
2. By editors who have the good of the profession at heart.
3. By all physicians, who will find it the safest course to place little reliance upon illy based opinions or the journals who habitually publish them.

REPORT OF THE SECTION

ON THE

Practice of Medicine and Obstetrics.

REPORT OF THE SECTION

ON THE

PRACTICE OF MEDICINE AND OBSTETRICS.

THE Section met at 3½ P.M., May 8, and was called to order by the Chairman, Dr. D. A. O'DONNELL, of Maryland.

Dr. S. FITCH, of Portland, Maine, presented and read a paper entitled *Three Ovariotomists*, which, on vote of the Section, was referred to the Committee of Publication.[1]

Remarks on Ovariotomy, by Drs. WHITE, of New York, and W. L. ATLEE, of Pennsylvania, occupied the remainder of the session.

MAY 9th.

Section was called to order at 4 P.M.

Dr. E. Seguin, of New York, read a paper *On the Use of Fever and Surface Thermometers.*

On motion, the paper was referred to the Committee of Publication.

Dr. G. W. BEARD, of New York, read a paper on *Recent Researches in Electro-Therapeutics*, and illustrated the same by batteries.

On motion, it was voted that the author again present only the original portions of his paper, with a view to referring it to the Committee of Publication.

Dr. WASHINGTON L. ATLEE, of Pennsylvania, read a letter on a case of stricture of the vagina in a puerperal woman, and desired the opinion of the Section, which was given by several members.

On motion, the Section adjourned.

B. F. DAWSON,
Secretary.

[1] Not forwarded to the Committee of Publication.

MAY 10.

Section on Practice of Medicine and Obstetrics called to order at 4 P.M. Dr. O'DONNELL in the chair. Dr. J. K. BARTLETT, of Wisconsin, was appointed Secretary *pro tem.*

On motion of Dr. T. J. GALLAHER, of Pennsylvania, the paper of Dr. JOSEPH JONES, on Yellow Fever, was returned to the Secretary of the Association, as it was impossible at the present late hour to properly examine it.

Dr. BEARD had not been able to make an abstract of his paper, and at his request, on motion of Dr. ELSNER, of Colorado, it was referred back to him with the request that it be published in some medical journal.

Dr. A. SAGER, of Michigan, presented a deformed pelvis, and made some interesting remarks.

Dr. J. S. PARRY, of Pennsylvania, made some remarks on Rachitis.

Dr. M. A. PALLEN, of Missouri, then made some remarks on Gastric Raphe, of Dr. G. Thomas.

On motion, the Section then adjourned.

D. A. O'DONNELL,
Chairman.

J. K. BARTLETT,
Secretary pro tem.

CLINICAL THERMOMETRY.

BY

E. SEGUIN, M.D.,

OF NEW YORK.

CLINICAL THERMOMETRY.

THERE is among physicians a general feeling—akin to popular confidence in the advent of a moral principle—that clinical thermometry heralds a medical revolution.

There is, in the minds of practitioners who have already applied the thermometer, a conviction that this instrument will enable us to discriminate, explain, and classify the anomalies of physiological combustion, as the watch aided Sydenham, Willis, Boerhaave, etc., to reckon the extraordinary rhythms of the pulse in fever, and thereby to formulate the pathological anomalies of the law just discovered by Harvey.

There is, also, in a narrower circle of observers, a growing comprehension of the possibility of using the thermometer, not only to regulate the application of heat and cold as remedies, general or local, but for testing the value of the thermogenic qualities of true remedies.

It is quite reasonable to admit that, to one at least of these three classes of thinking men, each of us belongs. Therefore the questions pending on the subject of thermometry interest every one of us as individuals, and all of us as representatives of the thousands left on duty at home, and the difficulty is not in finding what to say to you on this subject, but in eliminating what may be omitted.

Taking what is sometimes sarcastically called—what I proudly call—an American view of the subject, I will omit all that is theoretical, and all that you can find in European books, and come at once to that which interests us most, and which must become the subject matter of the books of to-morrow.

I conceive that, with our irrepressible tendencies to positivism, the next questions about thermometry will bear upon the perfecting of clinical thermometers, the simplification of the modes of reckoning the temperature, and the popularization of both thermometers and clinical charts among physicians, mothers, nurses, etc.

The thermometers used by physicians, medical clerks, etc., have been borrowed from physicists, as the instruments used by the older surgeons were taken from the carpenter's tool box. There-

fore, we must not be surprised to find them inadequate to our object, mainly in these two points: their shape is ill-adapted to measure the local temperature of the human surface; and their scales start from points far away from the human temperature, to which they correspond only by some point of their extremities. By the former imperfection, we are deprived of the advantages occurring to medical and surgical diagnosis from the mathematical measurement of local temperatures, and of their comparison with general hyperpyrexia. By the latter, we lose the possibility of receiving as true, and of using in our computations, the thermometrical data taken in our absence; since experience demonstrates that it is unsafe to trust the thermometric observations of even professional assistants (see Wunderlich), as long as the scale of the instrument does not correspond to that of human temperature: what they do not understand, they improperly perform.

Such being the state of affairs with the ordinary shaped thermometers, and with their Fahrenheit, Reaumur, and Centigrade scales, it was desirable to give them a shape susceptible of adaptation to any bodily surface, and a scale whose figure would correspond to and express physiological and pathological conditions.

The first of these desiderata seems to have been attained by the invention of an instrument whose mercury reservoir is almost flat; thin enough to be promptly sensitive, and just broad enough to adapt itself to uneven, as well as to level surfaces; somewhat lens-shaped; two centimètres in diameter, surmounted by a stem of nine centimètres, and graduated, like the fever thermometer, upon the scale of human temperature, of which presently.

The second object was accomplished by putting the zero of the fever thermometer where Brechet had established the precise point of normal health, or physiological temperature of man; and by graduating the stem—thence, up to mark the degrees of ustion in fever, down to mark the degrees of cooling in devitalization or collapse. These degrees, as above acknowledged, are centigrade—not because the older scales could not be run up and down the physiological point accepted as the norme; but because Von Humboldt,[1] Berzelius, Laplace, Liebig, Virchow, as well as the not-yet-reading peasants of continental Europe have accepted it as the unit of universal mensuration.

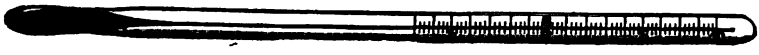
[1] See Experiences sur le Galvanisme et sur l'Irritation des Fibres muscularies et nerveuses, de Frederic Alexandre Humboldt, Paris, 1799, in which the metric system is already used to the exclusion of all others.

The third, and not less important simplification of clinical thermometry consists in writing (instead of drawing) the local and general temperatures, obtained with the surface and fever thermometers, upon tables as easy to fill as the pages of a blankbook, and as easy to read as book matter. This proposition, of substituting the plain record of degrees for the showy curves traced on diagrams, is prompted by the facts, that few physicians have the time and skill to trace these curves; that it is questionable if the heads of public hospitals have the right to exact from their pupils and assistants the immense manual labor required to fill up these diagrams; that, once drawn, the great cost of engraving and printing them immeasurably limits their publication, and thereby deprives the students of many observations which might give the elements of new pathological laws; that, if these diagrams present, at a glance, a bird's-eye view of the fluctuations of the vital signs quite satisfactory to the sight, they have yet to be reduced to writing, and tabulated in computable figures to give out their innermost signification.

For these reasons, I prefer, propose, and use, the plain written tables of temperature and other vital signs which, it is true, exact a formal reading instead of a glance, but which contain, in comparable form and in great number, the elements of clinical judgment.

To fill up these tables, or clinical charts, does not require more than ten minutes at each visit, and ten more each week for summary computations; the physician who cannot give this much time to a new case had better, according to the sentence of Wunderlich, not undertake the charge of the patient.

Even if I had the power, it would not be so desirable to enter into the details of the new applications of thermometry to practical medicine, surgery, nursing, education, etc., as to offer a plain illustration of the diagnostic and prognostic powers of the fever and surface thermometers, and of the new clinical charts working together.



Physiological Thermometer.

Surface Thermometer.

To this explanation and to its delineation, I will devote, if you please, the rest of the time or space allotted to this essentially practical and medical subject.

The concurrent use of this clinical chart with the two thermometers above described, suggests a few remarks:—

1. The day of the beginning of a disease must be the first of its thermometrical observations. However, several days are usually allowed to elapse in waiting for a better, during which, for obvious reasons, no thermometric observations are taken; though it is the first thing to be done; since the knowledge of the temperature rules the diagnosis, the prognosis, and the therapeutics; and its ignorance, from the start, endangers the life of the patient and the reputation of the practitioner.

How different it is in the families where mothers have been taught to use the thermometers, and to fill up the charts. There, at the first appearance of an indisposition, the thermometer is applied morning and evening, or oftener; and if the temperature becomes threatening, the physician is sent for.

He finds a record of the premonitory symptoms; if not of all, at least of those relating to the feverish state of the subject. If the fever ends inside of a week or expands itself into successive septenaries, this first line of the clinical chart is given to the observation of the days of sickness, and closes with the notation of the days of maximal and minimal temperature.

What is derived from this first line, besides the fixation of the *initium*, is the day of the culmination of the ustion, *its acme*, one or more in a week, or during several weeks; of which acme, not only the absolute and the relative elevations, but the place early or late in the septenary, are full of meanings.

The same remarks obtain for the relative fall and times of occurrence of the minima, except that the inferences to be drawn from their figures are diametrically the reverse of the preceding ones.

2. The hours of observation which occupy the following line of the chart have an importance second to no other signs. They rarely have an intrinsic value, except at the extremities of the human scale, but everywhere a comparative one. Indeed, it is well known that the comparison of the hours at which the daily fluctuations of temperature take place is often pathognomonic.

3. The general temperature is written on the chart as it is seen on the stem of the medical thermometer: all the degrees above the *norme*, over its ideal line; all the degrees below, under said line; each series summed at the column of the septenary, and divided by the number of the observations taken in the week: for, in critical

periods of a disease, and with a plain and lucid system of thermometry, the physician may be supplied with hourly or even permanent observations, whose trustiness almost equals in value that of his constant personal attendance.

4. The next line gives the daily averages, taken by dividing the sum of the observations of each day by their number, whatever it may be: of which successive averages let us mark the serial fluctuations, or the mathematical progressions. This line terminates by the weekly averages, whose figures are so important in many respects, alone or compared with those of other septenaries; and in this particular, that they do not cease during the disease to express mathematically the altitude above 0 norme, at which the drama of hyperpyrexia is played.

5. The last line given to general thermometry records the daily differences resulting from the *excursus* (eccentric course) of the diurnal temperature. These differences are of the highest prognostic value. Wide differences between consecutive temperatures, even taking place at a very moderate distance from 0 norme, do not allow us to indulge in the hope of a near favorable issue. Whatever be the favorableness of the other vital signs and symptoms, these morbid fluctuations (counted by degrees) must come nearer the healthy undulations of the normal temperature (counted by tenths of a degree), before we can give a favorable prognosis. But even then, when the *excursus* presents but fractional differences in the highest or lowest degrees of the human scale, as from 6 to 7 above 0 norme (thus written $\underline{6}$–$\underline{7}$), or about 3 below (thus written $\bar{3}$), no good issue can be prognosticated from this stillness of a function, whose healthy habitus is, on the contrary, expressed by gentle diurnal undulations, assimilable in more than one respect to the smooth heavings and falling of the ocean tide.

6. The local temperature, taken with the surface thermometers, occupies the following line of the chart. It is interesting in every case of local phlegmasia, either alone, or compared with the axillary temperature of general hyperpyrexia.

Alone, the effervescence and defervescence of local sickly temperature are admirably recorded by the quick sensitiveness of the surface thermometer; and it is hoped that more familiarity with the working qualities of this instrument will enable us to detect the preliminary movements of local temperature and other characteristics, upon which might be founded the diagnostic of incubation and evolution of local phlegmasia.

Concurrently recorded with the general temperature, the local temperature acquires an importance far beyond its own. Hence, the concurrent use of the fever and surface thermometers, and the comparison of the data furnished by both, and recorded on the clinical charts, will, for the first time, permit us to investigate and solve the problems of precedence, causality, reaction, etc., between local phlegmasia and general hyperpyrexia, with the precision expected from a mathematical operation. This is one of the noticeable results of the introduction of positivism in the clinic.

7. The pulse, degraded from its first position, ranks upon this chart second to temperature in diagnosis; but what is lost in position, is gained in importance; since, to its proper and many significations, are added those which it borrows from the temperature, as temperature borrows new ones from it.

The proper significations of the pulse are increased, at least in certainty, by the new mode of recording and comparing its data, from morning to night, from day to day, from week to week. But the significations of the pulse in relation to temperature extend far beyond its proper reach; and when we compare its variations, as recorded for their frequency by the watch, and for their wave-form by the sphygmograph, with the fluctuations of the local and general temperature, we feel that we work with a new instrument of incomparable precision. With it, the relative preponderance of the disorder of one of the vital functions upon the others is not only known, but measured.

8. This stride in positive diagnosis is rendered more sensible by comparing the figures representing the movement of the respiration—which occupy the last line of the chart—with those representing the movements of the ustion and of the circulation. In so doing, we are confronted by the very problem of the statics of life, somewhat so expressed:

Each of the three great vital manifestations of life has its *norme*, common to the whole race as combustion, or special to individuals as respiration and circulation; *normes* which physicians must know, to start from in every case. Otherwise how could they appreciate the extent of the departure of each function from its *norme?* These departures generate crises called diseases; their magnitude represents in figures the magnitudes of the perils of life; and the method of recording severally, seriatim, and comparatively, the figures expressing the anomalies of circulation, respiration, and ustion, is, in reality, biometry at the bedside.

No. Name.	Age.	Sex.	Disease.	Septenary.	Observations concerning the Secretions, Excretions, Food, Drink, &c.
Norme of Temperature.	of Pulse.		of Respiration.		

1872. Month.	I	II	III	IV	V	VI	VII	No. 1.
Days of Disease.								Maximum day, / Minimum day,
Hours of Observation.	M~~E	M~~E	M~~E	M~~E	M~~E	M~~E	M~~E	Total of morn. temp., / Total of even. temp.,
General temperature taken at the axilla. Fever.....(1) / Zero Health... 0 / Depression....								Total up, / Zeros, / Total down,
Daily average.....								Average of temp.,
Daily Difference...								Id. of difference,
Local temp. (2) above / below 0								Id. of local temp.,
Pulse.....								Id. of pulse,
Respiration.....								Id. of breathing,

(1) Physicians using the old instruments borrowed from physicists will write 37° Centigrade, 29°.60 Reaumur, and 98°.6 Fahrenheit, where the medical thermometer founded on human temperature marks zero-health, and the other degrees up or down as directed.

(2) The local sickly temperature is expressed by the difference found between surfaces isothermal in health; the healthy one being relatively the norme.

It would be easy, but tedious, to enter into more theoretical details concerning the combined power of the fever and surface thermometers, and of the clinical charts. It will be more profitable to introduce in this place the chart of a week's observation in blank form; so that physicians can fill it with actual cases which may presently engross their attention; unless they prefer to do the same mental operation with the two observations of erysipelas which follow, and whose report will close the practical part of this paper.

The first case was that of a woman of greater physical expansion than strength, and subject to previous attacks. In her, the general fever was never as high in proportion as the local, though it preceded it; its daily differences being as small as one-tenth of a degree, never above one degree, averaging 0.72. In keeping with this remarkable moderation and uniformity of the general temperature, the pulse never rose above 112, nor fell below 72. Alone, the respiration, by its initial frequency, averaging 23 during the effervescence, created an apprehension of pneumonia—then prevalent—but soon settled at 16½ in the defervescence. Quite in keeping with the greater height of local temperature was the formation and oozing out of purulent matter under the right eye, which left a persistent, thick scab. The defervescence, moderate as the effervescence had been, closed the seventh day at $\frac{2}{}$, apparently cut short by bilious critical evacuations, which suddenly brought the temperature to zero-norme, and the patient into convalescence with a ravenous appetite.

The second case—that of a primipara not yet completely recovered—was beset with more perils; still it ran its course of three septenaries with a regularity which gives it the appearance of one of these beautiful types created by the synthetic art of Wunderlich out of thousands of homologous cases; therefore, let us mark the mathematics of its evolution.

In the first septenary the effervescence is protracted to the fifth day; in the second, to the third; in the third and last it is subdued in forty hours.

In the first septenary the average of general temperature is 3.5; in the second, 2.42; in the third, 1.2.

In the first septenary the difference between the daily maxima and minima averages 2.35; in the second, 1.7; in the third, 1.2.

In the first septenary the local temperature averages 4.5; in the second, 2; in the third, 1.

The pulse, in keeping with the pyretic symptoms, averages in the first septenary 107; in the second, 90; in the third, 73 beats.

The respiration remained so near the norme that it seemed useless to record it.

The convalescence, which is yet in progress (28th of April), caused a rise of the temperature of 0.5 to 1.5, and a corresponding acceleration of the pulse.

As for the main question: In what relations of precedence, causation, duration, and reaction stand the general and local temperatures in the two cases therein reported? . . .

In the first case, the fever preceded the phlegmasia by fully twenty-four hours, and overlapped it by thirty-six. In the second case, the initial fever reached at once its maximum, 7; and the phlegmasia its maximum, 8, the second and third days. In the second septenary the fever reached its maximum, 6.6, the first day, and the phlegmasia its maximum, 5, the second. But in the third septenary the fever-heat rose only the second and third day; whilst that of the phlegmasia rose steadily from the first to the third day, after which it did not rise above zero.

These are mathematical facts.

What can be deduced from them?

I will venture to surmise that:—

1. If erysipelas did not show itself typical in its daily undulations, it proved to be endowed with septenary fluctuations, which have the appearance of a type.

2. No less distinct than this septenary cycle was its division into two periods; one of effervescence and the other of defervescence; though, as the elements of ustion wore away, the days of combustion became less, and those of cooling more numerous.

3. One may also surmise, from the march of the local symptoms at the end of the second and at the beginning of the third septenary (see Case No. 2), that a complete resolution of local temperature, even to zero = health for several days, is no guaranty against a relapse; guaranty to be sooner looked for in the state of the general temperature, and particularly in the smallness of the *differences* between the daily minima and maxima.

If men were accustomed to go directly by the way they consider best, without inquiring who took it before, and who will take it after them, as the Indian crosses a stream, it would suffice to point out the directness of the method of thermometry founded upon the graduation of the human scale of temperature to win over to this

method all the thinking men of our profession. But the prospect of loneliness on the new road, and the habit of routine, will raise considerable obstructions, and this system will have its foes, but it can make friends too.

On the one hand, it will meet with the opposition of the students who have accumulated valuable observations, taken with one of the old instruments, and who cannot well afford to convert their past observations based upon the old scale into the new one; and with the hostility of those whom the word *progress* sets in a rage, because it threatens the invasion of their still brains by a new idea.

On the other hand, the physician who looks only onward with a sense of duty will not hesitate to put the new thermometers and their tabulated scales in the hands of the mothers and nurses who assist him, and to teach them the working of this family instrument of safety. By this act of patience, and the clearness of its results, he will soon have enlisted the sympathy and faithful co-operation of these helpers: what is easily understood is easy to do. This remark applies so perfectly to the object of this paper, that I have seen a girl of seven years give thermometric reports with the new instruments and tables, which upon verification, were always found faultless. What an advantage for a physician to be able to see through other's eyes, during his long absence, and often in the most critical moments. For my part, I have not yet found a mother, who, having used during three days a thermometer marked zero where the life of her children is safe, would consent to part with it, or to exchange it for another, which informs her with equal precision of the point at which mercury freezes, or snow melts.

My last word on the subject is this: Let us educate mothers and nurses in the latest improvements of the methods of recording the vital signs, and most especially those furnished by the temperature; and if we give to this teaching a tenth part of the time which impostors give to the inoculation of the belief in their personal superiority, we should soon see the true medical thermometry, that one which is alone founded upon human temperature, universally applied, not only to the cure, but to the prevention of diseases; and, moreover, to the direction of the growth of children in physical and mental vigor.

This application of thermometry will be the subject of a separate paper.

CLINICAL CHARTS

Of Temperature, Vital Signs, and Septenaries, to register three weeks' Observations, made with the

FEVER AND SURFACE THERMOMETERS,

FOR HOSPITAL AND PRIVATE PRACTICE. (1)

No. NAME. AGE. SEX. DISEASE.								SEPTENARY.
NORME of Temperature.....of Pulse.....of Respiration.....								
1872. MONTH.								No. 1.
DAYS OF DISEASE.	I	II	III	IV	V	VI	VII	Maximum day, / Minimum day,
HOURS OF OBSERVATION.	M ~~ E	M ~~ E	M ~~ E	M ~~ E	M ~~ E	M ~~ E	M ~~ E	Total of morn. temp., / Total of even. temp.,
Temperature at the axilla. Fever.....(2) / Zero Health....0 / Depression								Total up, / Zeros, / Total down,
Daily average.....								Average of temp.

(1, 2, 3.) See first page.

92.66	26.96	33.7	3.3	99.86	30.16	37.7	.7	105.80	32.80	41	4	110.66	34.96	43.7	6.7
92.84	27.4	33.8	3.2	99.95	30.20	37.75	.75	105.98	32.88	41.1	4.1	110.75	35	43.75	6.75
93.02	27.12	33.9	3.1	100.04	30.24	37.8	.8	106.025	32.92	41.125	4.125	110.84	35.04	43.8	6.8
93.20	27.20	34	3	100.22	30.32	37.9	.9	106.16	32.96	41.2	4.2	111.02	35.12	43.9	6.9
93.38	27.28	34.1	2.9	100.40	30.40	38	1	106.25	33	41.25	4.25	111.20	35.20	44	7
93.56	27.36	34.2	2.8	100.58	30.48	38.1	1.1	106.34	33.04	41.3	4.3	111.38	35.28	44.1	7.1
93.74	27.44	34.3	2.7	100.67	30.52	38.25	1.15	106.52	33.12	41.4	4.4	111.56	35.36	44.2	7.2
93.92	27.52	34.4	2.6	100.76	30.56	38.20	1.20	106.70	33.20	41.5	4.5	111.74	35.44	44.3	7.3
94.10	27.60	34.5	2.5	100.85	30.60	38.25	1.25	106.88	33.28	41.6	4.6	111.875	35.5	44.375	7.375
94.28	27.68	34.6	2.4	100.94	30.64	38.3	1.3	106.925	33.32	41.625	4.625	111.92	35.52	44.4	7.4
94.46	27.76	34.7	2.3	101.12	30.72	38.4	1.4	107.06	33.36	41.7	4.7	112.1	35.6	44.5	7.5
94.64	27.84	34.8	2.2	101.30	30.80	38.5	1.5	107.15	33.40	41.75	4.75	112.28	35.68	44.6	7.6
94.82	27.92	34.9	2.1	101.48	30.88	38.6	1.6	107.24	33.44	41.8	4.8	112.46	35.76	44.7	7.7
95	28	35	2	101.66	30.96	38.7	1.7	107.375	33.50	41.825	4.825	112.64	35.84	44.8	7.8
95.18	28.8	35.1	1.9	101.75	31	38.75	1.75	107.42	33.52	41.9	4.9	112.82	35.92	44.9	7.9
95.36	28.16	35.2	1.8	101.84	31.4	38.8	1.8	107.60	33.60	42	5	113	36	45	8
95.54	28.24	35.3	1.7	102.02	31.12	38.9	1.9								

REPORT OF THE SECTION

ON

Medical Jurisprudence, Hygiene, and Physiology.

REPORT OF THE SECTION

ON

MEDICAL JURISPRUDENCE, HYGIENE, AND PHYSIOLOGY.

MAY 7th, 1872.

THE Section met at 3½ P.M. Drs. S. C. BUSEY, Chairman, E. LLOYD HOWARD, Secretary, being present, with but three other members, adjourned until Wednesday.

MAY 8th.

The Section met at 3½ P.M.

A paper was read, by Dr. JOSEPH G. RICHARDSON, *On the Structure of the White Blood Corpuscle*, which, after brief discussion, was referred to the Committee of Publication.

Dr. H. HARTSHORNE read a paper *On the Present Condition of Vaso-Motor Physiology*, which was also referred for publication.

There being nothing further before the Section, it adjourned.

S. C. BUSEY,
Chairman.

E. LLOYD HOWARD,
Secretary.

REPORT

ON THE

STRUCTURE OF THE WHITE BLOOD CORPUSCLE.

BY

JOS. G. RICHARDSON, M.D.,

LECTURER ON PATHOLOGICAL ANATOMY IN THE UNIVERSITY OF PENNSYLVANIA,
MICROSCOPIST TO THE PENNSYLVANIA HOSPITAL, ETC.

REPORT ON THE STRUCTURE OF THE WHITE BLOOD CORPUSCLE.

SINCE the meeting of the American Medical Association in Washington two years ago, at which I had the honor of being appointed to prepare a report upon the structure of the white corpuscles of the blood, many valuable additions have, on the one hand, been made to our information concerning this curious morphological element, and yet, on the other, a general acceptance of Cohnheim's doctrine respecting the origin of pus has in much greater ratio magnified the pathological importance of the leucocytes in the circulating fluid. I, therefore, venture to hope that, notwithstanding this enlarged knowledge, the more than proportionately increased consequence of the subject will render interesting to you my researches in elucidation of several points, which so far have not been fully investigated.

The extended information acquired within the past few years has been chiefly due to the indefatigable labors of German histologists, among whom may especially be mentioned Max Schultze, Rollett, and the celebrated Prof. Stricker, of Vienna, whose Manual of Comparative Histology is, I believe, admitted to contain the best collection of monographs by high authorities, giving their most recent results of microscopical research into the minute anatomy of the various animal tissues. Hence, I presume, no more fitting introduction to my own observations can be found, than a brief sketch of our present knowledge in regard to the white blood corpuscle chiefly compiled from the pages of Stricker's excellent work.

The white globules, or, as I prefer to denominate them, the leucocytes of the blood, were first distinguished from the red disks by Hewson about 1775, but do not appear to have attracted much attention from pathologists until near the middle of the present century, when William Addison, in 1843, published his second

series of "Experimental Researches on the Actual Processes of Nutrition," in which he asserts their importance as constituting the cellular elements of both tissues and secretions. His observations, which were so much in advance of his age that they did not receive, as too often happens under like circumstances, a hundredth part of the notice they merited, were followed by those of Wharton Jones and Augustus Waller in 1846; Von Recklinghausen, who examined the amœboid motion of leucocytes, in 1863; Max Schultze, who studied these remarkable movements under the influence of artificial heat, in 1865; and Cohnheim, whose great doctrine of inflammation, as the result of a "wandering out" of migrating white corpuscles through the stomata of the vessels, was promulgated in 1867; since which time the leucocytes of the blood have been special objects of investigation to microscopists throughout the world.

Alexander Rollett, author of the monograph upon the blood in Stricker's handbook, above referred to, following Max Schultze, informs us that several kinds of white corpuscles are to be distinguished in human blood. "First, round cells, not attaining the size of the red blood corpuscles, composed of a thin layer of cell substance, investing one or two nuclei, which last are either spheroidal or flattened by mutual compression. With these may be associated other forms, equalling in size the ordinary red blood corpuscles, and like the former possessing nuclei. Lastly, finely and coarsely granular amœboid cells are met with, and various intermediate forms between them. In freshly drawn blood these last appear as more or less rounded or irregularly shaped forms. At a temperature of from 95° to 104° Fahr. lively movements resembling the creeping motions of an amœba occur. When the temperature, however, is raised above 122° Fahr., the movements cease and the cells harden. As long as they are in active movement they are capable of absorbing small particles of coloring matter, as of carmine and aniline blue, and also milk globules, into the interior of their bodies."

Prof. L. S. Beale looks upon the white corpuscles or "bioplasts" of the blood, in their normal state, as masses of structureless germinal matter (the kind of material which is alone concerned in the production of everything that lives, and is always derived from matter which existed before it); the "granular matter" detected in them, and supposed to enter into the formation of their substance, being in fact only the *debris* resulting from change after death.

As mentioned above, however, according to Max Schultze, many of the leucocytes in freshly drawn healthy blood exhibit well-defined nuclei, and since I have frequently been able to discover a nucleus in active amœboid corpuscles and have rarely failed to find one or more nuclei, of like shape and size, deeply tinted, in globules which have been subjected to the action of aniline solution, I cannot but believe that these masses are almost constant elements in the structure of the white blood corpuscles. Stricker declares that our knowledge of both the physiological and chemical characters of nuclei in all animal cells is very obscure, for although both Schleiden and Schwann held that the development of cells proceeded from the cell nucleus, and indeed it is well known that, as a general rule, when a nucleated cell divides, the division first proceeds from the nucleus which elongates, becomes hour-glass shaped, and ultimately constricted into two segments; yet, in opposition to the conclusions thus suggested is the fact that we are at present acquainted with non-nucleated cells capable of undergoing division; which is in itself a direct and sufficient answer to every statement that can be advanced in favor of the importance of a nucleus. The presence of an investing membrane around nuclei is doubtful, since they appear to be completely homogeneous, and are distinguishable from the surrounding protoplasm only by a single well-defined contour. As a further evidence against the probability of the nuclei being vesicular in structure, it is declared, on the authority of observations made in Rollett's laboratory, that after induction currents have been applied to the corpuscles their nuclei will coalesce. Of the chemical nature of nuclei little is known, although Kühne and Lauder Brunton state that it is probable they contain an albuminous derivative substance analogous to mucin, and it is certain that they present considerable resistance to the action of acids and alkalies.[1]

The portion of matter surrounding the nucleus, and constituting the major part of the white blood corpuscle, called the protoplasm of the cell, is pronounced by Schultze, and still more emphatically by Brücke, to essentially possess its living force, although the former of these does not deny that the nucleus likewise plays an important part. Dr. Beale, it will be remembered, includes

[1] Dr. Brunton considers that the nuclei of the red blood disks of the ovipara are composed of a material resembling mucin, but differing from it in being insoluble in lime- or baryta-water.

both nucleus and surrounding substance under the term of protoplasm or bioplasm, and speaks of the granules so commonly present as particles of formed material, or extraneous matter, suspended in the formless material of the corpuscle.

Another question, remarks Stricker, which remains to be solved, is whether we have grounds for admitting that, independently of any intra-cellular fluid, there exist any differences in the structure of the protoplasm. Max Schultze asserts that in the embryonal cells of the ovum, which he takes as typical examples of the fulness of cell life, "the protoplasm is no farther isolated from external objects than by the circumstance that it will not combine with the surrounding medium, and that it constitutes with the nucleus a single whole. A distinct membrane may, indeed, appear on the surface formed by the conversion of the outer layer of the protoplasm, but then it must be allowed to be an early indication of a retrograde process. A cell invested by such a membrane can no longer divide—that is a power possessed by the inclosed protoplasm alone. A cell with a membrane differentiated in its chemical characters from the inclosed protoplasm is like an encysted infusorial animalcule."

Stricker enunciates his views respecting cells generally as follows: "In reference to the boundaries of a cell we hold that the external limiting layers of protoplasm may undergo both chemical and physical changes, and there will then be produced a membrane that compared with protoplasm is of firm consistence. The recognition of a double contour line in the uninjured cell is indispensably necessary to prove the existence of an investing membrane." Brücke remarks upon this point: "The differences between the density of the surrounding medium and the cell, even when no investing membrane is present, will cause the appearance of a boundary line. But it is only from the presence of a second contour that we are able to recognize a difference in density between the investing substance and the contained material." If, moreover, a double contour line is observed after the action of reagents, no proof is afforded that a membrane existed during life. "I am myself," says Stricker, "inclined to believe that two functionally different substances are present, and am supported in my opinion by the circumstance that I have learned to recognize two active conditions: one in which the cell is dilated, as after immersion in water; and one in which it is contracted (shortened). Even if the dilated condition, as on Hermann's hypothesis, is to be regarded as

a condition of rest, we must from this point of view also admit the existence of two functionally different substances." In these statements he appears to refer to the white corpuscles of the blood.

In regard to the composition of the molecules so generally present in the space between the nucleus and the peripheral border of a white blood globule, Stricker and Rollett give us no positive information; but in relation to their movements the former of these gentlemen remarks: "The greater number of amœboid cells become globular when exposed to the action of water, but after a few seconds a vibratory action of the granules is observable, after which the cells generally burst; some, however, remain globular for a time, and then recommence their amœboid movements: this is particularly the case if, as has already been mentioned, they are moistened with a one-half per cent. solution of common salt. The cells that assume a globular form on the addition of water, seem also to increase in size, from which it may be concluded that they imbibe some of the fluid. The laws by which water or a solution of any substance is thus taken up are unknown. It seems probable, however, that diffusion plays a part in the process. We may also conceive that the water which has penetrated into the interior of the contractile substances acts as a stimulus because we are already acquainted with the similar action exerted by water on muscular tissue, and because electrical currents produce similar effects on the cells."

"The vibratory movement of the granules," he observes, "reminds us of the so-called molecular movement of Brown. It may be witnessed in the salivary corpuscles and under certain conditions in the colorless blood corpuscles, pus corpuscles, and others. On this account it has been doubted whether these movements really depend on the vital properties of the protoplasm. Such movements, it may be observed, occur also in dead cells, as in the case of granules that have escaped from cells undergoing disintegration, which continue to move provided that the medium they enter does not present any obstacle.

"Similar movements, too, are found in cells that are clearly living. The dancing movement ceases in the interior of the corpuscles of saliva on the cautious addition of a (salt) solution of from a half to one per cent.; but this still permits the movements in fresh pus or lymph corpuscles to continue.

"Recklinghausen has described similar phenomena in the latter kind of corpuscles. When the menstruum is diluted with water,

they become spherical (an experiment that had already been performed by H. Müller and Reinhardt), and the granules in their interior begin to dance; but as soon as the fluid becomes somewhat more concentrated in consequence of evaporation from the margins of the cover, this vibratory movement ceases and the corpuscles commence again to undergo their customary changes of form.

"We see here, then, clearly enough, that two phenomena alternate: if the corpuscles are spherical, the granules dance in their interior, but, if the corpuscles undergo changes of form, then the granules cease to vibrate. It is rare to see the so-called molecular movements in cells which change their shape. It may, however, be occasionally observed in the colorless blood corpuscles of the newt after the addition of water. The question whether the vibratory movements of the granules stand in relation to the life of the protoplasm, is only applicable to such living cells.

"The idea of a connection existing between the movement and the life of the protoplasm is essentially based upon these facts: first, that the cells in which it occurs are living cells; and, secondly, that the changes in the phenomena of life induce, or are followed, by the changes in the motion of the granules. In the mean time, observation of the movement of the granules alone cannot enable us to draw any conclusion in regard to its dependence on life so long as it is only a vibratory and not a progressive movement, and so long as some peculiarities are not discovered in these vibratory movements which justify such a conclusion."

From this abstract it appears that Stricker and Rollett, who, upon this subject, occupy the front rank among German microscopists and histologists, whilst inclining somewhat to the view that the white blood corpuscle, at least in the later stages of its development, possesses a cell wall, differentiated in structure from the cell contents, do not accept as proven the existence of such a membrane; that they also consider that the laws according to which leucocytes appear to take up fluid are unknown, although they deem it probable that diffusion plays a part in the process; and, further, that they seem to think that the molecular or "dancing" movement in the salivary corpuscles differs from that seen under certain conditions in colorless blood, pus, and other corpuscles, insomuch as it ceases on the addition of a half to one per cent. solution of common salt, which "still permits the movements in fresh pus or lymph corpuscles to continue."

The experiments I am about to detail have for their object the

further elucidation of these three points left undetermined by Prof. Stricker, and, since a statement similar to his concerning the "dancing" motions in the salivary corpuscles has been quoted in opposition to the results of some of my own researches, which led me, as I believe, to the discovery of the true nature of these bodies, to wit, that they are migrating white blood corpuscles which have simply become distended by the endosmosis of rarer saliva (see *Pennsylvania Hospital Reports*, vol. ii. p. 253), I shall commence with an examination of its correctness.

Exp't 1st.—A drop of blood from the finger was placed upon a slide, with a few fibres of flax to prevent the cover from coming in too close contact, a thin glass laid over it and the whole adjusted beneath a $\frac{1}{25}$ inch objective giving a power of about 1200 diameters with the lowest eye-piece. A .17 of one per cent. chloride of sodium solution was then allowed to flow in at the margin of the cover, being conducted thither by a thread acting as siphon in the ordinary manner, from the reservoir of a "growing slide," the liquor sanguinis being carried off from the opposite edge of the thin glass by a slip of bibulous paper. The effect of this was rapidly manifested in the general distension of the colorless corpuscles from their usual diameter of $\frac{1}{2500}$ to that of $\frac{1}{1700}$ of an inch, with active "dancing" movement of the contained molecules, which was particularly observed in several instances, to commence, when the diameter of about $\frac{1}{2100}$ of an inch was attained, in a slow and feeble manner, reminding one very strongly of the suppressed struggles of waltzers in an overcrowded ball-room, or rather in a tent whose walls, being expanded subsequently, gave room enough for more rapid evolutions. When the dancing movement was clearly visible in most of the globules, the thread from the weak brine was removed and another conveying a .75 of one per cent. salt solution applied in its place, so as to bathe the corpuscles with a denser liquid. This was no sooner accomplished than the leucocytes were seen to diminish in size, the dancing motion ceasing when they were about $\frac{1}{2100}$ of an inch in diameter, apparently, in part because the molecules had no longer space to vibrate in the contracted corpuscles, and in part, because the fluid in which they floated within the leucocytes became too viscid to permit such vibration. Finally, when their normal magnitude of from $\frac{1}{2500}$ to $\frac{1}{3000}$ of an inch was regained, the amœboid movement again appeared and persisted in many cases for the remaining fifteen minutes during which the observation was continued.

Exp't 2d.—A specimen of mucus from the nasal fossa containing a large number of leucocytes exhibiting amœboid motion especially when slightly warmed by the concentration of the heat of a gas lamp by means of the concave mirror and achromatic condenser, was placed upon a slide arranged as in the preceding experiment, and the weak salt solution (.17 of one per cent.) introduced beneath the covering glass. A precisely similar distension to that noticed in the case of the white blood corpuscles was observed, followed, when the current was exchanged for one of .75 of one per cent. salt solution, by a contraction and almost universal cessation of the "dancing" movement analogous to that described in the first experiment.

Exp't 3d.—A drop of pus from a small abscess, whose corpuscles were rounded, granular, and about $\frac{1}{270}$ of an inch in diameter, was mingled with the .17 of one per cent. salt solution, and on examination the globules were found to have undergone distension to an average magnitude of $\frac{1}{170}$ of an inch, and generally to exhibit dancing movements of their molecules. On the cautious addition of a .75 per cent. salt solution, the leucocytes contracted, this time to $\frac{1}{290}$ of an inch, and one in particular to which attention was specially directed showed slight amœboid movements, becoming more marked and unquestionable upon gently warming the slide. I found that about one in fifty of the corpuscles in this specimen of pus were apparently but little affected by the stronger salt solution and continued to show dancing movements, although none of those in which this occurred had a diameter of over $\frac{1}{210}$ of an inch; they seemed, indeed, to be exceptional cases, when not more than half the usual number of molecules were present. On reintroducing the weak salt solution, several corpuscles which had displayed amœboid motions again became distended and attained the magnitude of $\frac{1}{170}$ of an inch. Although, in one particularly examined, dancing movements did not recur, they were manifested anew in several of those immediately surrounding it; not, however, with the frequency observed when the pus was first acted upon by the dilute salt solution.

Exp't 4th.—In order to test the question, whether the leucocytes of pus at different ages varied in their behavior with the chloride of sodium solutions, the following plan, which I would strongly recommend to other observers as simple, convenient, and efficient, was adopted: Five slender threads of untwisted silk (which, for subsequent convenience, should be of different colors) were drawn

by an ordinary suture needle for about half an inch beneath the integument of the upper part of the left forearm and cut off at a total length of some four inches. This tiny operation was of course no more painful than the puncture for two hypodermic injections, and was followed by an unexpectedly small amount of irritation and inconvenience, actually not equalling what is often suffered from an ordinary mosquito bite, so that there is nothing to deter any one really interested in the cause of science, from frequently repeating the experiment. At the end of twelve hours one of the threads was gently withdrawn without any compression at the edge of the counter-puncture that could be avoided, the portion which had lain beneath the skin instantly immersed in a drop of .75 of one per cent. salt solution previously placed upon a slide, and the external parts cut off. The little bundle of silk fibres was then ravelled out with mounted needles, covered with thin glass, and adjusted beneath the microscope. As was anticipated, numerous white blood (pus) corpuscles, almost entirely unaccompanied by red ones, were to be seen entangled among the fibres of the thread; these of course being leucocytes, which had as a rule made their way through the capillary walls, and into the interstices of the silk, subsequent to the introduction of the Lilliputian seton, so that none of them as pus globules were over twelve hours old. These corpuscles averaged about $\frac{1}{2700}$ of an inch across, and manifested well-marked amœboid movements when slightly warmed by the heat of the gas flame concentrated upon them by the condenser. On being subjected in the manner above described to the action of a .17 of one per cent. salt solution, they rapidly dilated to an average diameter of $\frac{1}{1900}$ of an inch, and manifested, instead of the amœboid changes of form, which ceased as they became spherical, active dancing motions of their contained molecules, in a majority of instances. When acted upon by the stronger salt solution, however, these leucocytes, which had assumed the form of salivary corpuscles, were promptly contracted, and the dancing movement simultaneously ceased in every one of a hundred globules, which were carefully counted and examined in the order in which they lay upon the slide.

Twenty-four hours after the threads were introduced, another bundle of filaments was extracted, and, after the same preparation as the first, was found to have entangled among its fibres at least twice as many leucocytes, many of them exhibiting amœboid movements. These corpuscles varied more widely in size than in either the preceding or subsequent experiments, a few of them not ex-

ceeding $\frac{1}{700}$ of an inch in diameter. When acted upon by the weak salt solution, a larger proportion of the whole number burst during distension, such rupture being especially prevalent among the smaller globules, suggesting the idea that their cell walls were less firm than in the larger corpuscles, and thus confirming to some extent the views of Prof. Stricker in regard to the proliferation and multiplication of the white blood corpuscles, outside of the vessels, where they exist as the leucocytes of pus. The great majority of the globules manifested the dancing movement when expanded, but, on subjecting them to the influence of the .75 per cent. salt solution in the manner already detailed, this motion ceased in nearly all, only three out of one hundred, counted as they lay without selection, continuing to manifest its presence. In two of these which were constantly exposed to a current of the stronger brine, the dancing movement was very active when inspected at the end of eight hours from the time it first became manifest.

After thirty-six hours, another thread, removed and examined with the same precautions as were used in the first case, showed pus corpuscles in still greater number, at least five times as many being visible upon the slide, and manifesting in a majority of instances well-marked amœboid movements. On the addition of the .17 of one per cent. salt solution almost every leucocyte exhibited dancing movements in its interior, which promptly ceased when a .75 of one per cent. solution was allowed to flow in at the margin of the cover. Out of a hundred counted as they presented themselves in successive fields, only four remained distended, and but two of these displayed continued dancing motion of their molecules. The introduction of pure water at the edge of the thin glass again raised up an apparent cell-wall, but the molecules seemed to have become adherent to the nucleus, so that of course no dancing movement could be perceived.

Twenty-four hours later (in all sixty hours from the time of commencing the experiment) the remaining threads were withdrawn, and when adjusted for examination were found to be loaded with leucocytes, many of them in active amœboid motion. For some unknown reason (possibly because endosmosis took place less readily through a thicker cell wall or to a less viscid cell contents), the .17 per cent. salt solution did not seem to have so prompt an effect in distending these corpuscles, but under the influence of an .08 of one per cent. solution, they rapidly expanded and manifested the usual molecular movement in their interior. Within a few of

these leucocytes there appeared in addition to the ordinary sized molecules some larger particles which in lustre closely resembled fat globules, and since the number of these was inversely in proportion to that of the molecules, it seemed probable that they had been formed by an agglomeration of the latter. After the dancing movement had manifested itself in most of the corpuscles (at least nine out of every ten), the current of the .08 of one per cent. salt solution was stopped and replaced by a .75 per cent. saline liquid by which the globules were rapidly contracted (the dancing movement ceasing when they attained an average magnitude of $\frac{1}{2500}$ of an inch), and the leucocytes were allowed to resume their amœboid motion which occurred in several with remarkable activity. The stoppage of the dancing movement was so complete that out of a hundred corpuscles, counted as they happened to lie upon the glass, only four had not become contracted, and in but one of these was any motion of the molecules visible. On reapplying the weak solution, dancing movements were resumed in about three-fourths of the globules, and the stronger salt solution again contracted these, producing, or at least allowing to recur, in many instances, slight amœboid changes of form.

Lastly, eighty hours after the minute seton was primarily introduced, a small drop of pus was pressed out from the track of the wound, and on examination, as described above, exhibited more markedly granular leucocytes in greater number than any previous specimen, many of them showing very lively amœboid motions. Under the action of a dilute salt solution (.08 per cent.) these corpuscles rapidly dilated, manifesting energetic "dancing" movements of their contained molecules. On adding the .75 of one per cent. saline fluid, however, they promptly contracted, the dancing motion as quickly ceased, and they resumed their active amœboid condition, which even subsequent to this rough treatment was as well marked as is often seen in the white blood globules. After re-expanding them with the weaker and contracting them anew with the denser salt solution, I found that out of one hundred counted as they came into view in successive fields, only two were met with that appeared to be unaffected by the stronger fluid, and but one of these continued to display the dancing motion.

Exp't 5th.—For the purpose of determining whether these isolated exceptions to the usual contracting effect of the stronger salt solution, upon the white blood, mucous, and pus corpuscles, had their analogues among the salivary globules, a small portion of

tartar removed from between two of the molar teeth was placed upon a slide, covered with thin glass and adjusted, as already described, for examination. After some search, a bay-like indentation in the margin of the tartar was found, occupied by a mass of some fifty salivary corpuscles, nearly all exhibiting the dancing motion of their molecules in great perfection. On introducing a current of the .75 of one per cent. saline liquid at the edge of the cover, these globules rapidly contracted, the molecular movement in their interior ceasing in the reluctant way already noted when describing similar phenomena in the leucocytes of blood and pus, and on being reduced to the diameter of about $\frac{1}{2500}$ of an inch, well-marked and unmistakable amœboid movements were seen to occur in several instances. Out of one hundred corpuscles counted in this and neighboring fields of observation, two were found which had not undergone the same contraction as the remainder, and in one of these the dancing movement was still manifest. After about fifteen minutes, pure water was allowed to penetrate at the margin of the cover in place of the salt solution, and as the fluid surrounding the corpuscles became diluted, they generally dilated, and one leucocyte, whose amœboid motions during contraction had been remarked as particularly active, again expanded to a diameter of $\frac{1}{1700}$ of an inch, displaying a very lively movement of its molecules, until after a few minutes it burst suddenly, emitting a number of particles which were soon carried by the current beyond the field of view.

These various observations of the prompt effect which a $\frac{3}{4}$ of one per cent. solution of chloride of sodium has in stopping the dancing movement within pus, mucous, and white blood (lymph) corpuscles, especially when proved as they were over and over again by seeing the same molecules recommence their motions under the influence of a weaker saline liquid, seem so conclusive that I need hardly detain you with the record of further repetition, but may pass at once to the other subjects of my investigations.

In order to explain the increase of size in the leucocyte of the blood (amounting when acted upon by an .08 of one per cent. salt solution to about eight times their original magnitude), it has been suggested, first, that the enlargement is due to some stimulating effect of the chloride of sodium; second, that it arises from the imbibition of water by the protoplasm or bioplasm of the corpuscle, just as a sponge or mass of gelatine will soak up and swell out with fluid; and third, that it is produced by the *osmosis* of a rela-

tively great amount of the rarer fluid, through an actual or potential cell-wall into the interior of the globule, which of course becomes largely distended during the process. To disprove the first of these hypotheses was the object of the following:—

Exp't 6th.—A small drop of blood from the finger, prepared and adjusted as in Exp't 1, was subjected to the influence of a .25 of one per cent. solution of ferrocyanide of potassium (18.2 gr. to the pint of water). As this fluid reached the white corpuscles, adhering here and there to the slide, they were rapidly distended, and their contained molecules commenced to move, sometimes with a dancing motion, but more frequently in a hurried chase after one another *around the inner surface of the cell-wall,* exactly as the granules within the cells of an Anacharis leaf may be seen to circulate for hours beneath the microscope. This singular effect of a variation of the kind of neutral salt dissolved in the liquid used to expand the leucocytes, occurred in this particular experiment with about two-thirds the number of globules, and in a few instances the current was so very energetic as to carry with it in complete revolutions the nuclei which ordinarily remain so firmly fixed in one position. I should have been inclined to suppose that this appearance might be an optical deception produced by the rapid rolling over and over of the whole corpuscle, as I have seen occur without change of place, had I not met with one or two examples which were slightly oval, and in which I could distinctly see molecules and nuclei, constituting all the visible cell contents, revolving in the direction of the long axis of the corpuscles, whose cell-wall, delicate as it must have been, seemed to have sufficient firmness to retain its oblong shape, notwithstanding the hasty movement within its cavity. After most of the globules had attained the size of $\frac{1}{1\,7}$ of an inch, a solution of .25 of one per cent. of chloride of sodium was allowed to penetrate from the edge of the cover, with the intention of washing away the yellow prussiate solution from around the distended leucocytes, without disturbing that portion of the latter liquid, if any, which had penetrated within their structure. Contrary to expectation, however, an immediate contraction of most of the globules took place, reducing their diameter to an average of about $\frac{1}{2\,0\,0}$ of an inch, although without causing the dancing motion of the contained granules to cease in the majority of cases. After the dilute salt liquid had been flowing for two or three minutes, it was replaced by a solution of the sesquichloride of iron, containing about two grains to the ounce of water, which

developed a faint blue color within most of the corpuscles, showing, I think, with an approach to certainty, that the ferrocyanide of potassium solution had penetrated within the leucocytes, and that the increase of magnitude manifested by them was due not to a chemically stimulating effect, but in part, at least, to simple distension by fluid of a corrugated, or possibly an elastic cell-wall.

Although Stricker and Brücke express themselves with such decision in regard to the necessity of detecting a double contour at the periphery of a cell before the presence of an investing membrane can be admitted, it seems to me that the recognition of such a duplicate outline is a question not solely of the existence of a membrane but also of its thickness. It will, I presume, be readily acknowledged that many films of tissue exist in animal bodies, as, for example, the arachnoid during fœtal life, which are of such tenuity that in a transverse section the naked eye, or even a magnifying power of ten diameters, can discern but a single contour, and yet no man in his senses will deny that such membranes have a positive existence. Further, histology teaches that other membranes occur which are but one-half, or even one-tenth, the thickness of the human arachnoid. These consequently can exhibit but a single contour when magnified twenty or one hundred diameters respectively, and yet it is easy to demonstrate that they are real, not imaginary structures. Since, therefore, our knowledge does not enable us to assert that membranes must necessarily be more than $\frac{1}{5000}$ of an inch, for example, in thickness, any more than we can say that hairs must be over $\frac{1}{5000}$ of an inch in diameter, or they do not exist, I cannot think that inability to detect, with the lenses now in use, both an inner and an outer border to the boundary of a cell, is sufficient foundation for denying the presence of a proper cell-wall; and believe this difficult question must be determined, if at all, on other and independent testimony.

Of such decisive character are, it appears to me, the dancing movements in certain cases, when, but few molecules being present, individual particles may be selected and (as I have frequently observed) distinctly seen to swim rapidly in a centrifugal direction, until they strike the single contoured boundary line of the cell, from which they *rebound* sometimes for a distance equal to one-fifth the whole diameter of the corpuscle. Also, I think, the surprising rotary motion noticed after the action of ferrocyanide of potassium solution as described in Exp't 6 is even more conclu-

sive, for it appears almost incredible that both molecules and nuclei could revolve so quickly within the limits of a cell, unless they floated in very liquid cell contents, or, again, that a cell made up of fluid so rare as to permit particles to move through it with such velocity, could either retain its oval shape, or restrict its rotating molecules within its limits, except by the aid of a membranous wall of considerable firmness. To recur to a simile, which I have already used in reference to the red blood disk, it seems to me that this hurried rotation of granules and nuclei inside of a white blood corpuscle, furnishes the same kind of proof that it possesses a cell-wall, as the swimming of a shoal of little gold fish around the inner surface of their vase affords us a demonstration, first, that they float in liquid instead of being embedded in jelly, and, second, that they are confined by a boundary wall firm enough not only to prevent them from passing beyond its limits, but also to retain its shape in spite of the pressure of the liquid within its cavity.

Another fact which tends to prove the existence of an envelope to the leucocyte, is the sudden bursting of the cell, and evacuation of its contents, which may generally be observed if the addition of fluid is carefully managed. Especially forcible is the testimony of this phenomenon when it happens as observed by my friend, Dr. W. W. Keen, Lecturer on Pathological Anatomy in the Jefferson Medical College, to whom I am much indebted for notes of this experiment, which are as follows:—

"May 21, 1870, ×1016 diameters. On gradually adding water to freshly drawn blood (by means of a drop of water, and opposite to it a scrap of bibulous paper to form a current), the granules in the white blood cells, previously motionless, began the vibratory movement noticeable in the salivary corpuscles, the movement always beginning at the margin where the dilution by water first took place. They gradually swelled and then burst, always suddenly.

"Sometimes the granules were disseminated in all directions as if from a wide and sudden rent, the granules separating and floating off with molecular (?) motion, and the apparent cell-wall shrivelled up around the nucleus or nuclei which were made more visible by the water. By Fuchsine, the nucleus or nuclei could be colored and distinguished from the shrivelled mass around.

"On several occasions I saw a white blood cell, in which apparently a very small rent occurred, and the granules passed out one

by one, and radiated away from the cell. They were shot out quickly, like balls from a 'Roman candle,' and gradually moved more slowly. The water apparently entered as fast as the contents passed out, *and the capsule did not shrivel*, but was still evident to the eye, with some of the granules still adhering to it."

In the course of my researches upon this subject, I have met with several facts, which, without being positive proofs, are nevertheless indications in favor of the existence of a cell-wall. Among these may be mentioned the phenomena presented by leucocytes in fresh blood diluted with rather more than an equal bulk of water and sealed up beneath a thin cover. In such a preparation, the amœboid movements are sometimes unusually active, and in one such experiment I observed an elongated white corpuscle attempt to pass on both sides of a little group of red disks adherent to the slide. After a prolonged struggle between the two ends as to which should be head and which tail, pending which it seemed that a mere mass of jelly must have been torn asunder, the left extremity overbalanced the other, and dragged it back up hill as it were across the mound of red globules. During this operation, the last two or three granules in the vanquished end, which had for a time showed dancing motions, appeared to be hurried along by the contraction of a delicate membrane which adapted itself to them as a slightly conical gum-elastic tube might do to a few bullets pushed into its larger opening.

Another item of evidence pointing in the same direction is the circumstance that if we boil half a drachm of pus in an ounce of .25 per cent. salt solution for a few minutes, and examine microscopically the sediment let fall upon standing, we shall find among the granules of amorphous albumen, and the shrivelled globules, a few faintly outlined spheres measuring about $\frac{1}{2000}$ of an inch across, exactly resembling the transparent corpuscles without nuclei or molecules, occasionally to be met with in pus, mucus, and blood after they are diluted with water, and probably consisting of empty cell-walls.

An hypothesis that the globules which show evidence of a capsule restricting the movement of contained granules are few in number and comprise only those which in their old age have become invested with a dense envelope of formed material, seems negatived by the fact that upon a slide of fresh blood prepared as above described, it is rare to find even in the comparatively large field of a half-inch objective, one single corpuscle which fails to

dilate and become spherical on the careful addition of water, and in which we cannot discern when more highly magnified, a dancing movement of the contained molecules.

In this connection it may be of interest to mention that whilst experimenting upon the red blood disks of the Menobranchus two years ago, I made a few observations in regard to its white blood and pus corpuscles which are formed upon the same gigantic scale, being about $\frac{1}{500}$ of an inch in diameter. The results then obtained are briefly as follows: First, that amœboid motion analogous to that displayed in the leucocytes of human blood occurs in these corpuscles, and is manifested not only by the protoplasm, *but also in a marked manner by the nucleus of the cell.* Second, that the white blood and pus globules of this creature expand, become spherical, and exhibit the dancing movement of their contained molecules under the influence of water, just as human leucocytes do in similar circumstances. And thirdly, that the molecules are frequently much larger than those in our blood globules, are apt to vibrate with a slower movement, and closely resemble in lustre and general appearance the minute oil drops seen in hepatic and other cells which have undergone slight fatty degeneration.

I had intended to make some further researches in confirmation of the evidence obtained in Exp't 6, indicating that the magnitude of a white corpuscle acted upon by a weak saline solution depends less upon the specific gravity of that liquid, than upon the diffusive power of the neutral salt which it holds dissolved, and hence affording direct proof of dialytic action exercised through an actual or potential membranous cell-wall. Unfortunately, however, I have been compelled by want of time to defer such an investigation for the present.

Reviewing now the facts and probabilities to which these observations lead, it appears that the additions they enable us to make to our information derived from German and English histologists, may be summed up as follows:—

The white blood corpuscle is a cell composed of, in the first place, a nucleus (or nuclei) which possesses the power of independent amœboid movement, and is insoluble in water, but capable of slowly imbibing that fluid until swollen to nearly double its normal size. The cell-wall of the corpuscle is a membranous envelope, insoluble in water even when boiling, too thin to exhibit a double contour with a magnifying power of 1200 diameters, but firm enough to restrict the movement of its contained granules within its

limits. Its exterior is adhesive, so that surfaces or particles coming in contact are liable to become attached thereto. Some phenomena observed lend countenance to a theory that this membrane is dotted with minute pores which permit delicate threads of the soft protoplasm it incloses to be extruded, and that the edges of these foramina, if the projection still continues, are carried outwards during the amœboid movement, forming a sheath to all except the extreme point of the tongue-like process.[1] The material occupying the space between the capsule and the nucleus, denominated the protoplasm of the cell (the fibrino-plastin of Prof. Heynsius) is a soft jelly-like matter in which chiefly resides the capacity of amœboid motion. This protoplasm appears to be soluble in water and saline solutions in all proportions, and when freely diluted loses its amœboid power, which, however, is regained in a majority of cases, when the excess of fluid is removed.

The laws by which leucocytes take up and part with fluid seem to be simply those of the dialysis of liquids through animal membranes by endosmosis and exosmosis, as investigated on a larger scale by Graham in 1855; the rapid inward current from the rare solution of high diffusive power, through the cell-wall, distending that membrane and diluting the contained fluid, until an equilibrium of the endosmotic and exosmotic flow is attained, or the capsule is burst by the centrifugal pressure of accumulated liquid.

The structure of the particles which exist in the protoplasm and exhibit dancing motions when the latter undergoes dilution is yet undetermined, although sundry facts indicate that their movement is not dependent on "vital" causes, but is merely a molecular one; also that some of them, at least, are minute granules of fatty matter which after a time may coalesce into visible oil globules, as in the

[1] I am well aware that this doctrine of a cell-wall seems inconsistent with the apparent fact that leucocytes take up into their substance particles of solid matter, such, for example, as aniline or cinnabar, during their amœboid movements; but, in the first place, I am inclined to believe, that many of these solid particles merely adhere to the surface and do not penetrate to the interior of the corpuscles, and, in the second place, I think, that, if we suppose the capsule, which my experiments indicate to exist, has pores exaggerated, in a small proportion of the globules, to the size of fenestra, we shall be able to account without difficulty, for this apparent impossibility in the remaining perhaps exceptional instances. Such an hypothesis, be it observed, varies widely from the view, that a stroma-like substance maintains the form of the white blood corpuscle, whose structure in the latter case would be comparable to the roof and upper part of a barn, with its transverse and diagonal beams, but on the former supposition is analogous to the windowed dome of a cathedral.

older pus corpuscles. In regard to any difference of their motion in the salivary bodies, my experiments as above detailed so fully and uniformly corroborate each other, that, reluctant as I feel to dispute the assertions of such celebrated histologists as Stricker and Pflüger, I cannot but call in question the general correctness of their statement upon this point; for it is manifestly inaccurate to affirm that a half to one per cent. salt solution still permits the "dancing" movements of fresh pus or lymph corpuscles to continue, when the fact is that the motion ceases in nineteen out of every twenty globules under its action, just as it would be erroneous to maintain that quinine does not stop the course of ague, because in one case out of twenty it fails to prevent a recurrence of the chill.

I therefore am induced to think from the above investigations, which I trust any critic will do me the justice to repeat before disputing, that, contrary to the views of these histologists, no essential difference exists in the effects of salt solutions of various strengths upon the salivary, pus, and white blood corpuscles; and from this circumstance, in conjunction with the interesting fact discovered during Exp't 5, that the salivary globules, when acted upon by the denser saline liquid, *contract to the size of the blood leucocytes, and manifest amœboid movements*, I conclude my theory, that the corpuscles of the saliva are "migrating" white blood globules, which, "wandering out" into the oral cavity, have become distended by the endosmosis of the rarer fluid in which they float (see *Handbook of Medical Microscopy*, p. 164), may now be considered established upon a firm experimental basis.

Whilst I cannot but hope that more important results will arise from these contributions to our knowledge concerning the white blood corpuscles, the only direct practical deductions I have as yet been able to draw are, in the first place, that the magnitude of the leucocytes in any neutral fluid of known composition in which they occur, as, for example, the renal secretion, affords us a useful index to its specific gravity.

In the second place, their prompt rupture and disintegration when exposed to the action of water suggests that in all surgical operations a .75 of one per cent. salt solution (54.6 grains of chloride of sodium to the pint of water) would have a much less disturbing influence upon the tissues washed and sponged with it than if pure water alone were employed.

Lastly, it seems possible that further investigation of the revolving motion, sometimes (not always) produced by solution of

ferrocyanide of potassium in the white blood corpuscles, may throw light upon the curious rotary movement in the cells of certain plants, which has for a long time been deemed inexplicable, and by a late writer is attributed to the presence of cilia upon the inner surface of the cell-wall.

ON THE

PRESENT CONDITION

OF

VASO-MOTOR PHYSIOLOGY.

BY

HENRY HARTSHORNE, M.D.

ON THE

PRESENT CONDITION OF VASO-MOTOR PHYSIOLOGY.

In the *Transactions* of the American Medical Association for 1856, the privilege was accorded to the writer of publishing a paper upon the Arterial Circulation, in which views were expressed and maintained, somewhat at length, in partial opposition to the then prevailing opinions of physiologists. It was at that time the teaching especially of the Webers, Virchow, and Bernard (to whose names have been since added amongst others those of Huxley and Marey), that the whole and sole functional action of the smooth muscular tissue, so abundant in the smaller arteries, is to limit, by its contraction, the flow of blood through the vessels; called by Prof. Huxley a "flood-gate" and by others a stopcock function; so that, as Virchow has expressed it, "the more active the vessel, the less the supply of blood." Opposed to this view have been the opinions of some of the older writers, as Unzer, Prochaska, John Hunter, and Sir Charles Bell; and against it, moreover, as it has appeared to the writer, is an overwhelmingly strong presumption, from the positive evidence of general physiological analogy.

Slow as has been the progress of recent investigation upon this point, Prof. Lister, of Glasgow, made an important impression upon the general tendency of reasoning concerning it, in 1858; in a direction in part quite similar to that of the Essay already referred to, of 1856. Since 1868, however, a more decisive contribution has been made to the inquiry, by the elaborate experimental researches of Legros and Onimus; published in the *Journal de l'Anatomie et de la Physiologie*, 1868–70. Some, at least, of the writers, before inclined to deny that any ground existed for doubting accepted views on the subject, now admit that a revision of those views becomes necessary; and it appears to be hardly too soon to anticipate that, very shortly, a reversal of the common teaching of the last twenty-five years concerning arterial physiology will have to

be made in all the books. Holding this opinion, I have thought it *à propos*, as a member of this Association, to lay claim, on behalf of its *Transactions*, for a certain part in the progress of this important inquiry, in the publication of the paper referred to, partially indorsed at the time by the award of the prize of the Association; in which, facts, reasonings, and conclusions were collated, in advance of all written upon the subject since the "Essay upon the Circulation" of Sir Charles Bell. I propose, in the paper now presented, to state, briefly and succinctly, the most essential links of the chain of argument by which, as it appears to me, a true conclusion upon the mode of action of the arteries may now be reached and sustained. A certain portion of this summary will be recapitulatory; as the time elapsing since my first publication is so considerable, and a later paper[1] had a somewhat disadvantageous opportunity of presentation to the profession. But the recent establishment of some facts which appear to be of demonstrative force, has been the occasion of my requesting renewed attention to the question at this time.

At the foundation of all study of the subject lies the universality of the law of *alternating* contraction in muscular fibre; first clearly shown by Bowman, many years ago, but more amply and elaborately established, within a few years, by Marey. Even in the most seemingly rigid tonic contraction, the latter experimenter was able to prove that it was not absolutely fixed, but rapidly vibratory, in every filament. All authorities agree, moreover, in finding this rhythmic character to prevail most evidently in the smooth or non-striated muscle of organic life; the heart, however, among the striated muscles, affording its most typical instance. In the veins, rhythmic contraction has been noticed by Wallæus, Steno, Lower, Whytt, Haller, Lancisi, Senac, Broussais, Allison, Marshall Hall, Flourens, and Wharton Jones, under various circumstances. In the pancreatic duct and ductus choledochus, such alternating contractions have been observed by Bernard, and by Brown-Séquard in the trachea and bronchia of birds. We are warranted by these as well as by the more familiar example of intestinal peristalsis, in conceiving it to be a most strong presumption, that everywhere, even in the arterial system, the law of smooth muscular tissue must be, that *its normal action will be alternating or rhythmic*, its abnormal condition only, that of temporary tonic contraction or rigidity.

[1] American Journal of Natural Sciences, July, 1868, p. 290; under "American Intelligence," etc.

Certain facts in animals seem to make necessary this explanation. In fishes, for example, the heart is respiratory; its impulse being to a large extent expended in sending the blood through the gills; this must then find its way through the system mainly by arterial action. *Amphioxus* presents a sort of demonstration of this; as this fish has, instead of a true heart, a number of pulsatile dilatations of the great arterial and venous trunks; parallel to the enlargements, with similar function, in insects, myriapoda, and some other articulates. Allen Thomson remarks upon the difficulty of understanding how arterialized blood is distributed, in the whale, from the net-works of arteries connected with the intercostal and other vessels. This difficulty disappears when we perceive, in these arteries, a normally propulsive power.

Acephalous fœtuses afford evidence of an analogous kind. St. Hilaire, Chaussier, and Adelon aver that every acephalous fœtus is *acardiac*, as well as having no lungs. The circulation *must then be carried on by the arteries*. Every human embryo is, for a certain time, as acardiac as that of a myriapod; so that in it, also, the circulation must be arterial and capillary only, so far as its propelling power is concerned.

Erectile tissues present a problem only thus to be solved. Long ago, Müller discovered the *arteriæ helicinæ* of the penis; confirmed by Valentin and Kölliker. Earlier still Prochaska proposed the explanation that erection is caused by *active arterial injection*. The idea that a dilatation of the venous trabeculæ of the corpora cavernosa is an active cause of erection, is at once disproved by the absence of any such trabeculæ from the nipples, which also are truly erectile; and whose erectility, therefore, must be an active arterial phenomenon.

Legros, in 1868, having proved the remarkable thickness and power of the muscular tissue of the arteries of erectile tissues, asserts "*c'est bien l'élément contractile des artères* qui agit pour produire l'érection."

What can we make of the reddening, from increased vascularity of the skin, when struck with a switch or the hand (even a short time after death), or under the stimulus of friction, mustard, ammonia, or cantharides? Surely there is no "paralysis" of vaso-motor nerves, or of arterial muscular tissue, under any such causation. If there be a pure stimulation anywhere of a reflex or excito-motor character, it is here. Nor, in blushing, have we a right to make the assumption, often made, that a paralytic dilata-

tion of the facial vessels occurs. It, also, is an active arterial determination; a certain weakness of balance and control being thus shown, analogous to (though less morbid than) the muscular contractions in convulsions, in which the brain's control is withdrawn or overborne.

But more unquestionable instances still, perhaps, of arterial activity are seen, in certain states of physiological erethism; as, the flow of blood toward the maxillæ during dentition; to the ovaries during ovulation, and the testicles during spermatic excitement, periodic in many animals; to the uterus in gestation, and the mammæ before and during lactation; at the time of the new formation of the antlers in the deer, etc. In all these cases it seems an entirely gratuitous contradiction to suggest the idea of "paralysis" having any existence whatever.

Let us put together a few more facts now well known. In paralytic limbs the pulse has been often found diminished in force and fulness; the artery being gradually weakened, and thus not passively dilated as it is by the sudden section of the sympathetic nerve. From the arteries of a mortified limb there is no hemorrhage; the propulsive power of the vessels is lost.

When a limb has been crushed by a railroad car, or torn by a gunshot wound, the paralyzed artery does not bleed for the same reason.

Injection through the aorta in an animal just killed passes easily, as I have seen it do, to and through the capillaries: because the arteries assist in carrying it on. A longer time after death the resistance is much greater; the elasticity of the vessels, of course, remaining the same. A similar pointing towards the muscular propulsion of the arteries is very familiar, in the fact that they always empty themselves into the veins after death. In decapitated criminals, moreover, the blood (as Robin has shown) does not, as may have been expected, spout from the divided carotid and vertebral arteries, but goes on in the head carrying bubbles of air after it.

Legros and Onimus found, upon tying the larger vessels in animals, that the circulation was not at once arrested, but continued for a time, longer in cold blood vertebrates than in mammals. This observation had before been made, also, by Wilson Philip, Haller, Spallanzani, Kaltenbrunner, and Marshall Hall. More remarkably, Chauveau observed that compression of an arterial trunk, stopping the blood-current through it at the place of pres-

sure, does not always arrest the pulsation of the vessel, which must, therefore, have an *autonomy* of its own. Legros and Onimus state that in the human retina, in a case in which the *arteria centralis* had been obliterated by a clot, they could distinctly see, through the ophthalmoscope, peristaltic waves in the small vessels of the collateral circulation. Bernard found that after division of the sympathetic on one side, the pressure of the arteries upon that side was lessened; showing that (just the contrary of what has been often stated) the effect of innervation from the sympathetic is to *add to or confer* propulsive power in the vessels. Every one is now quite familiar with the paralytic dilatation caused in the "rabbit's ear" experiment of Bernard; and with the proof of its being paralytic found in the fact, that galvanic stimulation of the distal end of the ganglionic nerve will remove for the time the passive hyperæmia, by producing contraction of the muscular coats of the arteries involved. We have, then, in different cases, a passive, paralytic dilatation, with *slower* movement of blood, as well as an active, propulsive enlargement, with *acceleration* of the blood movement. Both of these are seen, and have often been described, in different parts, or stages, of the process of inflammation. Green, in his work on Pathology and Morbid Anatomy,[1] notices this; but, being under the influence of the view still current, of the purely stopcock action of the arteries, he somewhat *naively* remarks: "How an excitation of the nerve produces dilatation of the vessels and increased rapidity of the circulation is, however, unknown." According to the view now and here taken, it is precisely what was to be expected, as the primary effect of a direct excitation, not sufficient in power to produce the result often witnessed by Wharton Jones and others, of *contraction*, followed also by passive dilatation; this last being the consequence of muscular exhaustion or fatigue and relaxation. Contraction, or rigid tonic action of the muscular tissue of an artery, as in the galvanic experiments of the Webers (which have been long allowed to have undue weight upon this question) we may well now perceive to be a wholly and merely *abnormal, pathological*, and exceptional result.

Professor Lister obtained[2] the attention of physiologists to the importance of reflex action in the vessels in connection with

[1] Philadelphia edition, p. 180.
[2] Philos. Transactions, 1858.

inflammation, as well as to the diminution of vitality in a part under "irritation," at the place of central stasis and arrest of nutrition: all of which points were fully set forth and insisted upon in my Essay in the *Transactions* of this Association of 1856.

The definition proposed for inflammation in that Essay was "a local lesion of nutrition, with concentric vascular excitement resulting in exudation." Later, I added[1] the words "*or* cell-distension and proliferation." In Stricker's account[2] of the experimentally produced phenomena of inflammation, we find the following: "traumatic interference, disturbance of circulation, exudation of fluid and morphological constituents, disturbances of nutrition, new formation."

We have an illustration of the practical importance of the part taken in the inflammatory process by the action of the vessels (almost ignored by Virchow, Bennett, and others, but restored to the attention of the profession by the remarkable observations of Cohnheim), in the sedative effect of ligation or compression of the artery supplying blood to an inflamed part. On this topic, a valuable paper was contributed by Dr. S. W. Gross;[3] setting forth numerous facts of this import observed by himself and by Drs. Onderdonk, Rogers, H. F. Campbell, Maunder, Vanzetti, and Blackman.

This paper would have to be too much extended to enable me to state fully the application of the above conclusions to pathology and practice. One or two points only may be named. The theory of fever may need now to be reviewed; and an idea believed for a time to be obsolete may have to be revived, viz., that during the chill there is spasmodic constriction of the smaller arteries, followed by their relaxation during the hot stage, transudation being then interrupted, but renewed again, with critical increase of secretion when the vessels are recovering their normal calibre.

Dr. George Johnson's theory of the pathology of cholera, so far as it emphasizes the constriction of the pulmonary artery and its branches, seems to fall short by limitation; it ought to have been extended to *all* the arteries, and to the organic muscular tissue everywhere throughout the body. From this must result (as Dr. C. D. Meigs well called it "*the cholera squeeze*") a transudation of blood-serum into the channel most natural for its escape; as well as, also, the general *sthenic spasm* of the collapse itself.

[1] Essentials of Practical Medicine, 1867.

[2] Experimental Pathology, Vienna, 1869.

[3] Philada. Med. Times, Jan. 16, 1871.

Dr. G. Johnson has proposed an ingenious conjecture concerning the hypertrophy of arterial muscular tissue in the kidneys, along with hypertrophy of the heart, in Bright's disease. He believes it to be adaptively protective, by *checking off* (according to the current vaso-motor theory) the entrance of blood when the kidney tissue is so obstructed as not to be prepared to allow the natural secretion to occur through it. Instead of this theory I would suggest, that the hypertrophy *both* of the heart[1] and of the minute ramifications of the renal arteries is most probably protective, in a manner essentially the same as that which is usually accepted as accounting for cardiac hypertrophy in valvular affections; namely, under increased activity needful to overcome the resistance of obstruction; in the heart, direct resistance to the flow of blood; in the kidneys, to normal secretion and transudation.

A single word must conclude what I have to say upon the topic of the pulse. Its factors must clearly be:—

1. The heart's impulse.
2. The elasticity of the vessels.
3. Closure of the aortic valves.
4. The muscular arterial systole.

The latter, the muscular element, *cannot* be *null*, because it empties the arteries after death. It cannot maintain the arteries in a constantly fixed state of definite rigidity, or the finger would detect it, in vessels large enough to be felt, which have a considerable share of muscularity. Therefore, since there must be time for the elastic tissue in the larger and medium-sized arteries to *second* the wave-movement produced by the heart's impulse, before the wave of momentary stiffening and contraction in the smaller arteries occurs under the stimulus of their distension (as, for example, the pulsation of the radial artery at the wrist corresponds in time, about, with the second sound of the heart), from these proofs we are to infer, that the pulse is made up of *all* these factors together; there being *a true arterial systole* following consecutively and rhythmically upon that of the heart, and *contributing to*, instead of limiting or restricting, as has been commonly heretofore urged, the onward movement of the blood.

The force of this arterial systole may be estimated by means of a simple observation of Sir Charles Bell's, cited in my previous

[1] Dr. Bright found 52 of 100 cases of "Bright's disease" to have hypertrophy of the left ventricle; 34 of them without valvular disease.

Essay. When, in the sitting posture, one leg is crossed over the other at the knee, it will be seen to move decidedly with every pulsation of the heart; and this will still occur, even when a hundred pounds' weight is suspended to the foot. Yet but one-fifth of the power of the left ventricle can be expended towards producing this movement; and a very small fraction of such a weight will suffice to control the femoral artery at the groin. Hence the motion referred to must be chiefly due to the power of the arterial action throughout the limb.

All that there ever has been really in favor of the so-called "stopcock" function of the arteries, was the hasty interpretation of some galvanic experiments of the Webers, more than twenty years ago. When the conclusion which I now anticipate shall have become universal and final, it will indicate that, to make the experimental method fruitful in physiology, there must be combined with it a certain breadth and carefulness of reasoning, not always sufficiently regarded as essential to such investigations.

REPORT OF THE SECTION

ON

Materia Medica and Chemistry.

REPORT OF THE SECTION

ON

MATERIA MEDICA AND CHEMISTRY.

MAY 8th.

THE Section was called to order at 4 P.M. Dr. J. S. CRANE, of New Jersey, was elected Chairman *pro tem.*

Dr. B. F. CRAIG, U.S.A., made some remarks upon the introduction into this country of the Decimal System of Weights and Measures.

On motion it was

Resolved, That the inclusion of the decigram and of the cubic centimetre in the list of officinal weights and measures is considered as desirable, and tending to the advance of medical science.

Dr. LEMUEL J. DEAL, of Pennsylvania, Chairman of the Committee on the Cultivation of the Cinchona-tree, made a report showing a gratifying progress, Congress having been memorialized with a favorable prospect of success.

A Second Memorial to Congress was submitted to the Section.

Dr. A. H. STOUT, of California, was nominated on the Committee, vice Dr. ANTISELL, absent from the country.

The report was adopted and referred to the Committee of Publication.

A *Partial Report on the Production of Vaccine Virus in the United States* was submitted by Dr. EPHRAIM CUTTER, of Massachusetts. Owing to the lateness of the hour, and the small attendance, it was voted that the Secretary give notice to the Association that the paper would be read to-morrow at 4 P.M.

Adjourned.

MAY 9th.

Dr. ROGERS in the chair.

On motion of Dr. HENRY HARTSHORNE, of Pennsylvania, the following was adopted:—

Whereas, In all capital criminal trials involving questions of medical jurisprudence, there is an obvious disadvantage in the testimony of the scientific experts, being made to appear partial and antagonistic by their being engaged as witnesses upon one or the other side; therefore,

Resolved, That it is the sense of this Association, that in important criminal cases requiring the evidence of medical or chemical experts, the cause of justice will be promoted by the appointment by the court, in every such case, of a commission of experts empowered to collect all purely scientific testimony bearing on the case, and report upon it to the court by which the case is to be tried.

Resolved, That by the appointment of such scientific commission, the present system of summoning chemical and medical witnesses in criminal trials might be dispensed with to advantage.

Resolved, That the same recommendation applies also to cases of accusation of surgical or medical malpractice.

Resolved, That the State Associations be requested to bring this matter at an early date before their respective legislatures.

Dr. R. C KEDZIE, of Michigan, gave an account of the so-called Magnetic Wells of his State.

Owing to the indorsement of scientific men of authority the waters of these wells had gained a wonderful notoriety and reputation for cures which the effects of cold water, hygiene, and travelling were sufficient to account for. There were one hundred and fifty of such wells. Water in barrels, lined with zinc, and in bottles at three dollars per dozen, has been sent all over the country in large quantities, and marvellous cures were reported. In addition, tin cups immersed in the water acquire a golden color, giving rise to the report that this wonderful liquid contains gold as well as magnetism.

The savant that reported the presence of magnetism based his experiment on the following observation. A piece of soft iron wire connected a cup of the water with the earth. Approached with a magnetoscope the dial indicated magnetism. Dr. KEDZIE omitted the water in the same experiment and attained a similar

result. He also tested the tubing of wells that had *not* reached water at all and found them magnetic. The indications were due to terrestrial magnetism. The gold color of the tin dissolved in caustic potassa.

Dr. ROGERS remarked that there was hardly a large piece of steel, or iron, that would not give indications of magnetism; hence the fallacy. He also described Holtz & Wilden's electrical frictionless machines, showing that muscular force was the developing agent.

On motion of Dr. EPHRAIM CUTTER, of Massachusetts, it was

Resolved To recommend that, at the next meeting, there be a conversazione embracing practical experience in Materia Medica.

It was stated that there are numbers of practitioners of large and successful experience whose valuable items of personal knowledge are buried with them at death. Modest, yet self-reliant, they do not contribute to the common stock of knowledge. It was thought that three minutes' talk would bring forward such contributors and greatly increase the interest and attendance on the Section.

Dr. CUTTER also presented his *Partial Report on the Production of Vaccine Virus in the United States,* which was read and on motion referred to the Committee of Publication.

On motion the Section adjourned.

EPHRAIM CUTTER,
Secretary.

PARTIAL REPORT

ON THE

PRODUCTION OF VACCINE VIRUS IN THE UNITED STATES.

BY

EPHRAIM CUTTER, M.D.,

WOBURN, MASSACHUSETTS.

PARTIAL REPORT ON THE PRODUCTION OF VACCINE VIRUS IN THE UNITED STATES.

FOR several decades after the immortal Jenner had promulgated his discovery we find no efforts to improve the quality of the Vaccine Virus employed in the United States of North America. The only precautions employed were to procure it from healthy human subjects and transmit it from arm to arm.

The effects of such virus were not and have not been questioned by the great mass of the regular medical profession. The physical appearances, the phases and the physiological results tallied so accurately with those laid down by the original authors that most have been satisfied. Perhaps the constant dinging of popular prejudice against the virus ordinarily employed as infecting the system with other diseases besides its own, and the recent alleged cases of syphilis communicated by vaccination, have tended to awaken inquiry into the improvement of the virus.

The alarming prevalence of smallpox and varioloid in cities has also thrown some discredit upon vaccination, and stimulated research into the subject of the deterioration of the virus in ordinary use.

However unjustly aroused the suspicion, the medical profession in a matter of so much moment is obliged to meet it, and exhibit an acquaintance with the grounds of confidence in one kind of virus more than any other. It is the aim of the present paper to allude to some of the efforts that have been made, on this side of the Atlantic, to secure (if possible) a better supply of vaccine virus —premising that it is still to be proved whether this virus is really any better than carefully selected humanized lymph as ordinarily employed.

I. ATTEMPTS TO PROCURE ACTIVE VACCINIA BY INOCULATING KINE WITH VARIOLA.

The first that we notice is that of Dr. John C. Martin, formerly of Attleborough, Massachusetts.

We quote a graphic account from the *Boston Medical and Surgical Journal.*

"Attempt to Procure Vaccine Matter from the Original Source—Production of true Variola. [Communicated for the Boston Medical and Surgical Journal.]

"In the year 1836, Dr. John C. Martin, then a practitioner of medicine in Attleborough, Massachusetts, conceiving that the sometimes imperfect protection afforded by the vaccine disease arose from a deterioration in the matter used, inserted into the udder of a cow, lymph taken from a pock upon the body of a man who died of variola. Subsequently matter derived from the cow was inserted into the arm of about fifty persons. This was at the middle of October. Presently, one Babbitt, being among the first vaccinated, began to exhibit unlooked-for symptoms which alarmed his family. Physicians were summoned, and after examination and comparison of opinions, the patient was declared to have the true smallpox. Then all those who had been vaccinated from the same source inquired anxiously what was to be their fate. The vaccinations (the sequel will show that inoculation was the more proper term) had been made on successive days up to Babbitt's illness, and others soon began to be affected. The physicians in the neighborhood again assembled, and recommended that due precautions should be taken against the spread of smallpox, as probably all who had received the virus from Martin must suffer unmodified variola. Dr. M. became at once the most unpopular of men, although, as I learn from contemporary informants, one of whom was himself a sufferer, the experiment had not been entered upon without consultation, which relieved him from undivided responsibility. Excitement and consternation prevailed, sustained by the consecutive occurrence of new cases. Business was suspended; the panic of fear magnified the danger, and no man could see where it would end. Dr. M. stoutly contended that the phenomena were merely the manifestations of genuine kinepox in its pristine force; but we have the testimony of Dr. Sylvester Fuller, that the disease was variolous. Dr. Fuller was an accomplished physician; had served in the army, where he had seen much smallpox; and his evidence, in concurrence with other physicians of the time, is conclusive. Two hospital houses were established, to which many of those attacked were removed. Four months elapsed before the last patient was discharged. Not all

who received the virus were sick; and of those who suffered, three died.

"The affair quite ruined Dr. M. He went to the West, returned insane, and remained some time in a hospital. He is still living, mildly crazed, but not incapable of intelligently following some simple occupation.

"The senior Dr. Manchester, of Pawtucket, then in active practice, received some of the crusts from Dr. Martin. They are represented to have been thinner, and differing in appearance from the normal vaccine scab, and were not used.

"As the experiment of transmitting smallpox virus through the system of the cow has, at sundry times, been successfully accomplished, the question arises, What was the cause of Dr. M.'s failure and mishap? The conclusion seems unavoidable that the matter taken from the cow was not the modified virus, but identical with lymph inserted from the human subject. Doubtless it had lain in the wound unabsorbed and undigested, and, after a festering process quite local, the eschars were removed, and the non-vaccine matter re-introduced in pseudo-vaccination.

'Take thou some new infection to thine eye,
And the rank poison of the old will die,'

was the philosophy of Shakespeare. Unfortunately Dr. M.'s experiment was in conflict with the injunction. The preservation of the virus unspoiled, while deposited in the cow's udder, is quite consistent with the well-known persistent character of the contagion. S.

"ATTLEBOROUGH, Feb. 1860."

The next attempt noticed is that of the late Dr. Horatio Adams, of Waltham, Massachusetts. We quote from his address delivered before the Massachusetts Medical Society, May 26, 1858.

"The fact is probably familar to all, that within the last twenty years it has been shown that the cow-pox can be produced by inoculating the cow with variolous matter. In the October number of the *British and Foreign Medical Review*, for 1839, may be found an account of Mr. Ceeley's experiment of inoculating the cow. Soon after this, in conversation with a gentleman, whom, in the words of another, I am privileged also to call my teacher, my physician, my friend, James Jackson, it was arranged that the writer should repeat Mr. Ceeley's experiment as soon as pure smallpox matter for the purpose could be procured. A brief

account of this experiment, the first, it is believed, that was ever performed in this country with successful results, may not be out of place here.

"On the 11th of January, 1840, I made several punctures with the point of a lancet under the cuticle on the right labium pudendi of two different cows; none of the punctures were sufficiently deep to draw blood. Into each of them was introduced a pointed quill well deluged with variolous matter, and allowed to remain for half an hour.

"On 15th, the punctures were barely visible, but not apparently inflamed.

"On 16th, two of the punctures made on the youngest cow were more distinctly visible; in drawing the finger over them, a slight hardness was felt. None of the other punctures had inflamed.

"17th. These two punctures were more inflamed and a little raised, showing a pearly white flat top, rather small.

"18th. Punctures larger than yesterday, and each capped with a pearly white flat vesicle, with centre depressed.

"19th. The punctures (now vesicles) are enlarged, centres depressed.

"20th. Each of the vesicles is nearly four lines in diameter; surface pearly white, flat, with centres depressed, areola not formed, slight crust in centre. This P.M., end of ninth day of disease, punctured one of the vesicles; found cuticle thick, spongy, and breaking, like what is seen when a vaccine vesicle is early punctured on the arm. Vesicle distinctly cellular. Transparent lymph oozed from the opening, with which I charged twenty quills. Cow appears perfectly well.

"21st. No material change.

"22d. Vesicle larger and more full, areola forming. Dipped several quills to-day; lymph pellucid. Drs. J. D. Fisher, C. Putnam, and Gregerson examined the case to-day.

"23d. Crust forming rapidly, areola somewhat increased in extent, three-fourths of an inch in diameter, round and regular, and somewhat raised above surrounding skin. Cow eats as usual. From this date disease rapidly subsided; a very dark crust was soon formed.

"On 27th, Drs. Fisher and Putnam brought me virus taken from a child vaccinated on the 21st instant, with the matter taken from this cow. The vesicle, as they both affirmed, exhibited the characteristic marks of the true cow-pox on the sixth day of the

disease. Many persons were subsequently vaccinated with matter taken from this cow, and in every instance the true vaccine disease was the result.

"This discovery of the identity, or, rather, I should say, this proof of the identity, of the vaccine and variolous diseases, is the most important fact observed in relation to the cow-pox since the original discovery of Dr. Jenner. For, if any doubt should ever arise as to the genuineness of the virus in use, or if it should at any time be lost, as it frequently may be in certain localities, and smallpox make its appearance, it can be reproduced with certainty by inoculating the cow with smallpox virus."

The writer was present at the reading of Dr. Adams's address, and was inspired to repeat the experiment, as no one had successfully done so since. Accordingly the work was begun in the winter of 1859–60, on a herd of fifty cattle, kindly put at my disposal by that whole-souled merchant-farmer, Mr. John Cummings, of Woburn. The following is extracted from the report made in the *Boston Medical and Surgical Journal* for 1860.

Unsuccessful attempts to produce Variola in the Cow, by inoculating with the Virus of true Variola—Perfect success on using the ordinary Vaccine Virus.—Acting upon the commonly received opinion both of the public and the profession—namely, that cow-pox is smallpox modified and mitigated by a transmission through the system of the cow—it would be natural for any physician to expect to procure pure primary vaccine virus by simply introducing into the system of the cow the virus of variola from the human subject.

It was under this conviction that a series of experiments were conducted upon about fifty kine. It is proposed to give an account of the same in the present paper.

Experiment 1. Nov. 26, 1859.—Inoculated four young kine with variola virus taken on November 19, from one of my own patients, at about the eighth day of the eruption. Punctures were made with a lancet upon the hairless skin beneath the tail and near the vulva. The virus was introduced upon quills and covered with isinglass plaster, as in the ordinary mode of vaccinating the human subject. At the expiration of a week, no effect like vaccination was produced. In fact, there seemed to be nothing more than a moderate inflammation, just such as would result from a non-specific puncture.

Expt. 2. Dec. 27.—With variolous virus taken on the eighth

day (Dec. 22) of the eruption, by Dr. Luther Parks, Jr., of Boston, Dr. Alonzo Chapin, of Winchester, at my request, inoculated five kine. The writer inoculated seven, including steers and heifers.

Punctures were made with a lancet, near the vulva or anus, and upon the teats. The quills, charged with the virus, were introduced, allowed to remain a few minutes, and then suffered to drop out. The operations were conducted with the greatest care, so that there should be no mistake. About five quills were used upon each animal in this as in all the other experiments. On the 31st of December, a few of the spots presented to the feel a round and flat hardness, about half an inch in diameter. One spot had a central depression. This promised so much that it was very confidently expected that vaccine virus would be obtained. But the hope was illusory, for the spot did not pass through the normal stages of a vaccine pustule. On the contrary, it remained the same for more than a week, and then faded away. It was suggested by Dr. Chapin that the virus might possibly have been taken from a varioloid patient (it sometimes being very difficult to distinguish between them), and that thus the experiments proved nugatory. Subsequent experience, however, has not borne out this supposition.

Expt. 3. Jan. 6, 1860.—Visited a patient of Dr. Toothaker's, of Wilmington, sick with severe variola, and charged quills with matter. The eruption was at the seventh day. Inoculated seven kine with this matter, January 6, 1860. In these cases the cuticle was abraded by scratches, made with a lancet at right angles to each other, until the serum of the blood began to escape. The charged quill-points were then rubbed upon the abrasions for a moment or two. No satisfactory results. To be sure, pustules, or something that looked like pustules, were obtained. They were umbilicated, and some of them hard to the feel, but no lymph could be got.

Expt. 4.—Procured some quills, charged with variolous virus, from Dr. R. L. Hodgdon, of West Cambridge, on January 6, and on January 7 inoculated three young kine with the same. The mode was the same as in Experiment 3. No satisfactory result.

Expt. 5. Jan. 13.—Visited, with Dr. Drew, of Woburn, a small-pox patient under his care, and charged some quills in the usual way. Besides I charged some cotton threads, by rupturing pustules and imbuing in the lymph the threads for the distance of half an inch or more at their middle part. Within an hour of the

procuring of this virus, the quills were inserted into several cattle by the usual punctures with the lancet. The threads were introduced beneath the skin by means of a needle. They were then drawn through to the point charged with the virus, and with this engaged under the cutis, the ends were tied, and the seton thus formed left in. The threads remained in for three days. Inflammatory action ensued. There was swelling, with soreness in the vicinity of the punctures. Upon removing the threads, however, these symptoms subsided. No normal pustule was produced. This essay was deemed almost an "experimentum crucis."

Expt. 6. Jan. 18.—Went to Lexington, and took quills and threads from a smallpox patient of Dr. Currier, in the same manner as was practised in Experiment 5. These were used in inoculating four cattle on the 20th of January. These essays were without success, although the threads were allowed to remain a week.

Expt. 7. Jan. 25.—Received by express, from Dr. John A. Lamson, of Boston, some variolous virus from one of the crew of the slave yacht Wanderer. This matter was selected with care, and the case was a well-developed one. These quills were used upon four or five cattle.

At the expiration of a week, there was one pustule developed out of the sixteen or twenty punctures. Took what seemed to be lymph from this one pustule, and tested it, without success, upon another cow.

It is natural to expect, that after so many careful experiments, conducted without success, the experimenter should begin to doubt. I questioned my ability to inoculate; but of this I was not convinced, as I had successfully vaccinated a considerable number of human subjects during my practice of medicine. Besides, I was told by some, who had tried the same experiments without success, that it could not be done; that cow-pox must be found in a natural condition.

In the summer of 1862, the writer visited England and sought out Mr. Ceeley, of Aylesbury. Found him at his residence, and spent some time delightfully as his guest. I also hunted up with great difficulty Mr. Badcock, of London, who had repeatedly procured supplies of vaccinia from variola by inoculating kine. Both these gentlemen assured me that I was successful in my efforts. "*It was necessary sometimes to take an hour to obtain lymph enough to charge one ivory point.*"

So that I really succeeded in my efforts, and did not know it. Moreover, it shows that too much stress should not be laid on the physical characters or phases of a pustule in determining the true character of the disease.

As to the question of identity of vaccinia with variola, the proof is irrefragable; but it must be admitted, that it is with difficulty and almost exceptionally communicated. The method cannot be relied on in urgent circumstances.

There is less reason to regret this, as there is no doubt that the vaccinia can be renewed and propagated readily, and to an unlimited extent, by retro-vaccination. This method has been infrequently practised in this country, until the practice was introduced and demonstrated to be practicable by the writer.

II. Retro-vaccination.

This practice has been adopted over the country, and the writer has been credited with demonstrating that kine may be vaccinated as readily as the human subject.

The manner in which the writer was led into it, was simply this. Feeling much disappointed at the apparent failure of the attempts at inoculation, I was led to doubt the identity of vaccinia with variola, and, as an experiment—

"*Jan.* 20, 1860, vaccinated four kine with ordinary vaccine, such as I was using in vaccinating the human subject.

"24. The spots all look as if taking.

"26. On two of the four kine, umbilicated pustules, having in one instance a whitish summit, and in other instances being more swollen, with summits less white.

"27. One of the kine has three spots, half an inch in diameter. Bluish color well marked. Took a large number of quills, and on the same evening sent specimens to the members of the Middlesex East Society, and to other physicians who had assisted in procuring variolous matter for the purpose of experiment.

"28. Dr. Chapin visited the animals. He was assured of the abnormal characteristics of the *quasi* pustules procured by inoculation, and was satisfied with the normal appearance of the pustules produced by the vaccination.

"*Expt.* 12. Jan. 23, 1860.—Vaccinated two cows with vaccine virus from a child, on the seton plan. Did not take. Failure probably due to the imperfect moistening of the threads.

"*Expt.* 13. Jan. 24, 1860.—Vaccinated, on the seton plan, four kine, with virus received by mail from Dr. J. D. Mansfield, of South Reading. No other results ensued than what would ordinarily be expected to follow the introduction of an uncharged thread.

"*Expt.* 14. Jan. 28.—Dr. Chapin vaccinated two kine with the virus he ordinarily uses upon the human subject. Both took well, and a large number of quills were obtained from them, which were used with general success.

"Since the last experiments I have often successfully vaccinated kine, both with the crust and the quill. The pustules have generally been large, and have matured upon the eighth or ninth day after vaccination. They vary in size somewhat, being generally very large, and not small. In some, a characteristic blue color of the pustule and vicinity is observed. This happens especially when the seat of vaccination is upon the part of the labium where the skin merges into the mucous membrane. No constitutional effects upon the cows have been noticed."

Since the above was written, the writer has vaccinated heifers, calves, cows, oxen, steers, bulls, to the number of nearly one thousand. This is considered an unusual number. They were vaccinated with a view to supply virus of this description, to ascertain whether it deserved the opprobrium which systematic and other writers have thrown upon matter produced by retro-vaccination. Whether they speak from actual knowledge or not is not stated. *A priori*, the idea of retro-vaccination is according to the principles of common sense.

If ordinary vaccine virus by long use and inhumanization has been deteriorated, it is fair to suppose that by repassing it through the system of the original animal it would regain its original virtues, because being brought into contact with its original soil and source. A magnet is strengthened by a re-contact with a loadstone. But, as this paper does not propose a discussion of theories, and is devoted to announcing facts, we proceed to our relation.

During the late war the Government was made acquainted, by means of a Brooklyn physician, with my procedures. Specimens of my virus were forwarded to the Surgeon General's Office, received a thorough testing, and passed through the ordeal with success. I was ordered to furnish all the virus I could procure by this method, and in doing so the larger number of kine, mentioned above, were successfully vaccinated.

By the kindness of the authorities I am allowed to present the report of Surgeon and Brevet Lieut. Col. J. J. Milhau, who was detailed on a commission to examine my virus and the mode of collecting it.

The report explains itself.

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,
WASHINGTON, D.C., March 25, 1872.

Dr. EPHRAIM CUTTER, *Woburn, Massachusetts.*

Sir: In reply to your communication of the 21st instant, I have to inform you that you are authorized to use the report referred to in your letter in any manner you choose.

Very respectfully, your obedient servant,

C. H. CRANE,
Assistant Surgeon General, U. S. Army.

Endorsed: New York City, April 4, 1865; John J. Milhau, Surgeon and Bv't L't Col. U. S. A.; Report on Vaccine Virus, from Kine furnished by E. Cutter, M.D., of Woburn, Mass.; Respectfully forwarded to the Surgeon General; Sg'd, R. S. Satterlee, Brig. Gen'l U. S. A., Med. Purveyor. Med. Purv's Office, N. York, Apr. 6, '65.

(*Copy.*)

NEW YORK CITY, April 4, 1865.

Brig. Gen'l R. S. SATTERLEE, *Medical Purveyor, U. S. Army.*

General: In compliance with the instructions contained in your communication of which the following is a copy, I have the honor to report the result of my investigation.

(*Copy.*)

MEDICAL PURVEYOR'S OFFICE,
NEW YORK, March 27, 1865.

L't Col. J. J. MILHAU, *Surgeon U. S. Army.*

Sir: That I may be well assured of the quality of the Vaccine Virus from the Kine, received from E. Cutter, M.D., of Woburn, Massachusetts, you will proceed thither and carefully investigate the subject; keeping in view the purity of matter, healthfulness of animals, the manner of procuring the crust and other subject relative to the *Virus* that it is interesting to the Medical Department to know.

Respectfully, your ob'd't servant,

(Signed) R. S. SATTERLEE,
Brig. Gen'l and Med. Purveyor, U. S. Army.

In accordance with the above, I left New York on the 29th ultimo, reached Woburn, Massachusetts, the following day, and called upon Ephraim Cutter, M.D., who expressed his readiness to afford me every facility for investigating the subject. As my visit was entirely unexpected, there was no opportunity to make preparation, that might have given me a wrong impression; I found that Dr. C. had already made arrangements, in the ordinary routine of his business, for vaccinating certain cattle, and also for collecting the virus from others, I therefore accompanied him in his rounds and visited stables in Lexington, Lincoln, North Woburn, Jamaica Plains, and Brookline, and personally inspected the condition of over fifty head of cattle. Twenty-nine, mostly cows, had been vaccinated, and the loosened crusts were collected by Dr. C. in my presence, and I assisted him in vaccinating fifteen other cows. All the cattle vaccinated were of good stock, and of healthy appearance, well fed, and kept in clean, dry, and well-ventilated barns.

The "Natural Spontaneous Kine-pock" occurs but seldom in the cows of that district of country; occasionally the doctor's attention has been called to vesicular eruptions on the teats of cows with their second or third calf; he has vaccinated other cows with the virus taken from these vesicles, but, until recently, he has failed in producing the vaccine disease in this way; he is led to believe that cows are subject to eruptions on the teats which are not always kine-pox, or that the vesicles are broken in milking, and rendered too imperfect to communicate the disease.

The virus which he has been using in vaccinating cattle, and from which he has obtained crusts, was originally taken from the vaccine vesicle on a child, and reproduced in the kine.

Some three weeks ago, Mr. Jewett, a farmer near Lexington, noticed a vesicle on the teat of one of his cows with her third calf. Dr. C., being informed of it, took virus from the vesicle and introduced it into another cow, producing a characteristic vaccine vesicle, and with the lymph from this second cow were vaccinated Mr. Jewett and a heifer. I saw them both, the farmer had two fine vaccine vesicles on the arm, and complained of a little constitutional disturbance; he had been vaccinated in early life; in the heifer the characteristic scab had formed, and was nearly ready to be detached. I think there was no room to doubt but what this was actually the *kine-pock.*

The original cow with the scar on the teat, the second cow with

a fresh cicatrix, and the heifer with the scab, were all in the same stable at the time of my visit.

Early in March, Dr. C. found a case of spontaneous cow-pox in a cow with her second calf, the virus was tested by vaccinating two cows, on the Tuft's farm in Lexington, and obtaining characteristic vesicles and scabs. I inclose herewith a specimen crust of the natural and spontaneous cow-pox.

I examined twelve cows that had been vaccinated with this matter, and the crusts on them had the same appearance as that on the heifer above referred to, and did not differ from those on the cattle vaccinated with the virus reproduced from the child.

As Dr. Cutter now expects to furnish crusts produced by matter from the "natural and spontaneous" cow-pox, I recommended that he should put them up separately and mark them so that they might be known to the Department, and I would respectfully suggest that when received they may be issued to such officers as will give them a fair trial and report the result.

In vaccinating the kine, Dr. Cutter uses the lymph taken on the eighth day, or the crust collected on the twelfth or thirteenth day, and rubbed down with a little water to the consistency of cream. He objects to glycerine, because a physician in his neighborhood had the misfortune to spread phlegmonous erysipelas among the patients he vaccinated, many dying in consequence, and the general opinion of the profession was that the glycerine, in which the crusts were dissolved, had undergone some chemical change while carried in the vest pocket. In selecting matter for vaccinating the cattle, Dr. C. is necessarily very careful, as he holds himself responsible to farmers for the value of the cattle should they be injured by the operation; this I consider a good guarantee for the purity of the virus used, especially as the farmers are not entirely free from prejudice on the subject.

In vaccinating, fifty to seventy-five insertions of virus are made in the hairless spaces under the tail, about the perinæum, and in the commissure between the hind legs; all these insertions, however, do not take, more than half fail, owing to imperfect instruments, duplicature of the skin, rubbing of the tail, etc.; a cow with seventy-five punctures will probably not give more than fifteen or twenty perfect crusts, in some cases I saw but four or five good scabs on the animal. About two per cent. of all the kine vaccinated refuse to take the disease, being probably protected by having had the natural pock.

The crusts are fully formed, ready to be collected on the twelfth or thirteenth day, and fall off by the fourteenth; the scabs vary much in size, not only in different animals but in the same individual. In collecting the crusts, only the perfectly formed are taken, those that have been rubbed or scratched show a peculiar lustre and are rejected; hence, to obtain a number of good crusts, vaccination should be performed during the season of the year when the cattle are kept quiet in stables, and are not annoyed by insects.

After being collected, each crust is put up in wax; this is a nice operation, as heat must be used to cause adhesion of the wax, and must be so moderate as not to injure the virus; a tin canister filled with water of the proper temperature answers the purpose.

The lymph, when collected, is taken on the eighth day, by means of a capillary glass tube, which is afterwards hermetically sealed.

In conclusion, I would state that Dr. Cutter devotes much of his time and attention to the subject, and personally attends to all the details, the only assistance he receives is from his wife in putting up the crusts.

Having obtained all the information on the subject that I thought desirable, I returned to New York on the 2d inst.

Respectfully submitted, y'r ob't sv't,

(Signed) JOHN J. MILHAU,
Surg. and Bv't. L't. Col. U. S. A.

The report of Surgeon Milhau covers most of the ground. After an additional experience of seven years, I am able to add the following details:—

Kind of Kine Employed.—Any can be used. Sex, age, or condition offer no barrier of themselves, except perhaps pregnancy. In one or two instances I have known abortion to follow vaccination, but it was very doubtful whether the operation acted as a cause. To avoid chance of complication, I recommend to avoid cows well advanced in pregnancy. The previous occurrence of the natural or spurious spontaneous cow-pox is one of the greatest obstacles to successful retro-vaccination. From this there is no protection except in employing newly-born calves.

With bulls, steers, oxen, calves, heifers, cows, farrow and milch, I have had constant success. If I have any preference it is for healthy, well-developed cows, milch, about four years of age; color

black, skin soft and silky. In these the disease has been well developed more uniformly than in any other class.

There seems to be as much difference in the temperaments of bovines as in humans. If an animal of the nervo-sanguine temperament is selected, the operator is exposed to great physical danger, and if successful in the insertion the resulting disease is very apt to be interfered with by the movements of the beast to allay the irritation.

Generally the person who is acquainted with the animal is consulted, and such avoided. A few passes with the fingers over the sacrum and by the flank will determine the temperament of the animal. Generally the process of vaccination is one that both interests and amuses the animal, who will stand still enough. A great deal depends on the method of approach. There should be no loud talking, no boisterous demonstration, nor any violence employed on the animal. Kine are very easily frightened, have long memories, and are apt to resent injuries. They also are much attached to places, and suffer from nostalgia as keenly as human beings. For this reason I prefer to vaccinate them in their wonted stables. When the process is conducted quietly it is more successful. I have never employed constraint. Don't think it necessary to tie them up in frames feet upward.

Methods of Insertion.—I have often been asked, "Where can you vaccinate?" In reply, vaccination can be practised anywhere on the cutaneous surface of the body. I have preferred the hairless parts at the commissure of the thighs. The pustules produced elsewhere are filled with hair. This is objected to seriously by some physicians, but with no good reason, I think. On the other hand, as suggested by my late lamented father, Dr. B. Cutter, the hairs are a most indubitable evidence of the authenticity and source of the virus. A portion of the surface on the flank can be shaved off smooth, and afford a good place for insertion.

Mode of Insertion.—Almost any method which communicates the virus to a broken surface of the cuticle will suffice in a proper subject. The following methods among others have been employed:—

(1.) *Lancet Method.*

(*a.*) Ivory or quill points charged with virus are inserted into punctures previously made with a lancet, and allowed to remain several minutes.

(*b.*) Crucial or V-shaped abrasions are made with the lancet point, thus , and the charged point of ivory or quill is rubbed in; or,

(*c.*) The lancet is charged, by rubbing a spot of a crust moistened with milk or water till a softened portion is engaged on the end of the lancet, and then the crucial or V-shaped abrasions are made, and the matter applied without removing the instrument from the skin. This is a most excellent method; or,

(*d.*) The crust may be previously rubbed up with water to the consistency of cream, and then applied by the lancet point to abrasion or puncture previously made; or,

(*e.*) The lancet point may be dipped in liquid lymph from another pustule or capillary tube.

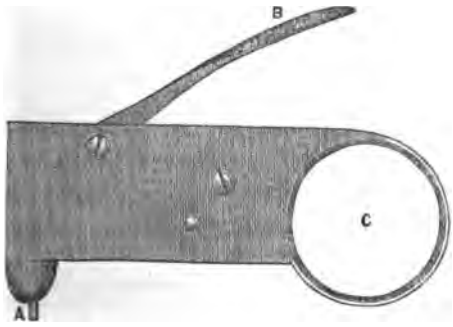
(2.) *Machine Methods.*

These are employed with liquid lymph from capillary tubes, or with comminuted crust.

(*a.*) Gordon's machine. This was introduced by Dr. Gordon, of Cincinnati. It is a useful instrument. The point of the vaccinator is charged by dipping into the lymph or liquid crust. It is then drawn back and caught by a catch. On depressing the trigger, the spring is released, and the point driven into the cuticle, on which it has been placed, driving in the virus into the puncture. The trouble with it is, that the virus will not always adhere to the point, the character of the point, which is circular, and that the springs often break. It requires two motions to set off the instrument after charging. Dr. Gordon deserves a great deal of credit for this invention.

(*b.*) Whittemore's vaccinator, Fig. 1, differs from Gordon's in

Fig. 1.



A. Point. B. Handle. C. Finger-hole.

that, with one motion the handle elevates the point and discharges it. This instrument was suggested by myself to my uncle, Mr. Amos Whittemore, of Cambridgeport—a born inventor—and subsequently it was modified to its present form by the Shurtleff of Codman & Shurtleff, of Boston, Massachusetts. The point differs from Gordon's, which is circular, in being a half circle.

The instrument in my possession is supplied with a point of my own device, which gives a V-shaped puncture. Its use is the same as Gordon's. The spring rarely breaks; altogether it is a very reliable instrument.

(3.) The *old-fashioned spring-lancet* is employed sometimes. The incisions made are very superficial, and are afterwards charged by rubbing on the comminuted crust or lymph. Only four knives are employed.

The course of the development of the disease resulting from the introduction of the virus is about the same as that observed on the human subject, with this exception, that the phases occupy less time, and the crust matures earlier.

All pustules in every case are not developed alike. Some will be perfect, large, and umbilicated, and others in their immediate vicinity will be small and imperfect, and yet the seed, so to speak, is the same, the time of sowing the same, the locality the same. Why this is, I know not. We see differences in human offspring of the same parentage, and cannot tell why.

A fact which bears upon the question of the advantages of retro-vaccination is that, by this process, imperfect matter will be brought up by culture, *i. e.* revaccinating into a succession of kine, to a state of perfection. I have repeatedly done this. The skin of the kine is the natural habitat of vaccinia. Vegetation flourishes best on its own native soil; why not vaccinia?

Is the retro-vaccination any better than that in common use?

After the writer had announced the process of retro-vaccination, he tested it in his own practice.

In 1860, "out of nine primary vaccinations with the retro-vaccinia, six took at the first insertion, and three the second insertion. Of fifty-three secondary vaccinations, thirty-nine took at the first insertion, thirteen took at the second insertion, one took at the third insertion. One of the thirty-nine was a lady ninety-one years of age, who had repeatedly been revaccinated unsuccessfully. Another one of the thirty-nine was vaccinated during the prodromic

symptoms of varioloid, and both vaccinia and varioloid ran through their stages side by side. Despite a good scar of the primary vaccination, the pustules produced by the retro-vaccine were large in size and like usual primary vaccine."

The period of incubation of the retro-vaccine is in some cases delayed over the time of the ordinary virus. The period varies, but it has not been observed by the writer to be more than seven days.

Ten or twelve years' subsequent experience has confirmed the above experience in my hands. It gives me great pleasure to be able to produce evidence from others. For the purpose of testing the question further, the writer has furnished considerable quantities of this retro-vaccine to physicians in various parts of this country. Early in January last, a circular was addressed to about five hundred of such, requesting a candid reply in relation to the efficiency of the virus furnished. Of the responses received, about seventy per cent. were favorable; thirty per cent. unfavorable. Most of the unfavorable were mainly inertness—the virus being deteriorated on its passage, in many cases, by the heat of the postal cars or post-office.

It has been a conscientious principle always to send off *ert* virus. Failures will occur in cases where the same virus at home, or returned, will take; so that not always is it the fault of the propagator of vaccine virus, if it fails. It is my impression that the crusts of this virus suffer deterioration sooner than those of human lymph; hence it should be early employed. Heat and moisture are the most destructive agents. Further remarks on this point will be found beyond.

At the risk of appearances, the writer begs leave to introduce some of those who have given evidence as to their experience.

One physician writes:—

"In reply to your communication of 7th instant, received this week, I would say, I esteem 'vaccination from kine' as superior to any. All which I received from you, was in every respect reliable. I vaccinated over three hundred for the Board of Health of this city, in 1863, at which time I largely employed the virus from kine procured from you. The effects were as severe, in my experience, as that of ordinary virus. I have no reason to consider it less, or more, protective. What I liked about the virus always was the clean, satisfactory pustules."

Another says: —

"All the crusts from kine received from you have proved satisfactory, giving very fine perfect pustules, going through regular courses; the scabs from which have served me perfectly through the whole season following, until the hot weather would set in, when I desisted from vaccinating. The ivory or quill points, which I obtained once only, failed, so that I never used them but once."

Another writes:—

"In reply to a circular requesting information in regard to the success of vaccine virus (cow) received from you, I would say, a few years ago I used it entirely in my practice, and was well satisfied with all but the last two or three receipts, which did not take even in primary vaccinations. I remember on one occasion being called to treat smallpox in a family where several of the members had never been vaccinated, and the results were as follows: The first case was ushered in with the usual premonitory symptoms, followed quickly by convulsions. The young lady who nursed the case, I vaccinated with your *cow-pox* virus after the eruption was out upon her patient; *it took*, and so did the smallpox; they ran their course side by side, the disease and vaccine pustule; the latter, I have no doubt, modifying the former, and rendering it a mild case of varioloid. The general results were satisfactory."

"Your circular of inquiries regarding the 'Vaccine Virus from Kine,' which I had received from you, came to hand this day. The virus was always satisfactory in every respect, and always appeared to be as represented. The effects were as severe as ordinary virus; though the impression on my mind is, it was rather more so than virus obtained from ordinary sources. My children were vaccinated from this source—I mean your supply—and though six or eight years have elapsed, they will not now take vaccination by the ordinary virus. I cannot tell how many patients I used your supply on, but I have not seen a case of any form of variola, in private practice, for years."

"My experience in animal vaccination commenced sixteen years ago. I don't know of any other medical brethren in our vicinity who started before us. The occasion of my commencing was finding the *pock* on my cow's teat, and having a friend who would not be vaccinated unless he could have it direct from the kine. All authorities which I consulted, noted the increased

severity of a direct vaccination from kine; but the result proved a mistake, as I repeatedly at that time, and ever since, have used animal vaccine when I could obtain it; and only occasionally have I been without it, and have never seen any severer effects from it, than from the indirect arm-to-arm plan. You have furnished me twice. The last time for my grandchild in San Francisco; which worked kindly, and which was proved to be protective and satisfactory, as my own son was having a severe varioloid attack, and very much broken out at that time; also, when smallpox was very severe in the city, and many physicians even began to distrust the preventive power of vaccination. I therefore have the idea that vaccine direct from the cow, is not inferior as a preventive, and works as satisfactorily and kindly as after repeated use from one arm to another; and, the great benefit of all, the impossibility of introducing eruptive or other disease into the system—though I have never known a case in my own experience where any untoward effect of that kind resulted."

"I got a crust from you several years since that was the best matter I ever saw. Out of twenty-four persons vaccinated, twenty-two took; some with excellent marks of previous vaccination, and one of them, a lady thirty years of age, who had resisted so many efforts at inoculation before, that she had grown to think that she was not susceptible of the disease. She was a lady in fine health, and the scab from her took well. It is my opinion that the kine-pock virus received from you, from time to time, has acted on the general system with a little more energy than the humanized that I have been able to collect from my own patients, and from my professional brethren, of several removes from the original; and I take great pleasure in saying to you, that, believing yours to be *genuine* kine-pock virus, I have been inspired with more confidence in its use than with promiscuous material, though they were scabs from fine appearing subjects. From the specimens of matter received from you, I think the inflammation in the part, and the symptomatic fever, have been quite as great as with the humanized; but the pock has been decidedly less inclined to get humid and run into a sore. I do not know of a single instance of an attack of varioloid, where your kine-pock virus has been used and has taken well; but know of several where humanized matter had been introduced, within the same space of time, and some of them were pretty well-developed cases of variola."

"In reply to your inquiries, I will say that the vaccine virus

from kine, which I have had from you at different times on quill points, was perfectly satisfactory to me; always producing smaller, but more perfect sores, and coming to perfection one to two days later from period of vaccination, than those produced by vaccine virus deteriorated by many transmissions through human subjects."

"So far as I am able to judge, it always proved perfectly satisfactory. The local disease always went through the regular stages —papular, vesicular, and pustular—in proper periods of time. The constitutional symptoms were always distinct in their due time. As to the protecting influence, I have not had any opportunity of proving it by any actual case of exposure of the person vaccinated to a case of smallpox, as the disease is rare, and even those who are vaccinated do not expose themselves unnecessarily. I presume, however, that the protection must be complete."

"I remarked no difference in effect between virus from kine and ordinary virus."

"The virus from kine received was satisfactory, except in one particular—it oftener failed to communicate the infection, than that *recently* from human subject. I have no reason to think virus from kine is less protective than that from the human subject, nor have I observed that its local effect was necessarily, or usually, more severe. The constitutional symptoms were usually, though not uniformly, more marked, and perhaps more persistent."

"It never failed to take in any instance of first vaccination, and I have succeeded with it in some instances where other virus had failed. During the winter of 1866–67, smallpox prevailed in M——, where I was practising. I had charge of all the cases. I used your virus in families, one member of which had smallpox, and it failed in no instance to protect those vaccinated with it, though previously not vaccinated. In fact, it in no case failed to be protective."

"Your circular received this morning in regard to vaccine virus. It has given satisfaction in most cases. Its effects have been more severe, and, as far as my experience goes, does not fail any oftener."

"In answer, I will say, that it has been used with satisfactory results, except it has not been quite as sure to take as fresh virus from the human subject. I have used it in the form of a scab. The constitutional disturbance may have been quite as great as from *perfectly healthy* virus from the human subject; yet that disturbance has in no case been one-fourth as great as that I have seen produced by human virus said to be pure. Not one of my

patients, vaccinated with matter from the kine, has been sick enough to require medical attendance, and I consider the protection much more certain than that obtained by human virus."

"The virus I have received from you, heretofore, has proved satisfactory. It seems more active, and less failures in its 'taking.'"

"In reply, I would say, that some of the vaccine virus from kine proved satisfactory, and, so far as I am informed, its effects have been about the same as those of ordinary virus."

"I have had vaccine matter of you several times. It has proved perfectly satisfactory, except one crust from kine, which I was not able to make work."

"The vaccine virus that I have received from you has been usually very satisfactory. I believe only in one instance did it fail. Then I notified you, and I received from you some that proved very efficient."

A number of favorable replies present answers to the question, "*Were the effects as severe and protective as that of the ordinary virus?*" as follows. "Yes."—"More severe; and, as far as I know, equally protective."—"The effects have not been as severe in my hands as that of ordinary virus, or virus from children."—"Not so severe, but equally as protective."—"More so, in my opinion."—"I think as much so."—"I have never seen any particular difference."—Etc., etc.

"It is with pleasure that I reply to a request from you, dated Jan. 7, 1872, asking my estimate of 'vaccine virus from kine,' which I obtained from you about a year ago. The result was satisfactory beyond all expectation. No one took the *disease*, notwithstanding it occurred in an unvaccinated subject, and was a beautiful specimen of the discreet variety, slightly confluent upon the face. I had previously obtained some vaccine virus of a friend in New York, but it was ineffectual. It is my custom to vaccinate by inserting the lymph in at least three places—a point, I believe, too little insisted upon in this country, a single scar not being as protective as two or three or more."

Of the thirty per cent. of replies to the circular, which were unfavorable, the objection was uniformly that the virus was inert—did not take at all. This objection obtains in the humanized virus as well, so that the business of supplying vaccine virus is one of the most troublesome of all departments connected with the medical profession, because of the liabilities to failure.

If the retro-vaccination is as unreliable a process as the system-

atic and other writers represent, it is fair to suppose that evidence of it would have come to light after the lapse of twelve years employment of such virus. I have, myself, witnessed no death from it, though such are reported of humanized lymph.

I think the effects are more severe than those of humanized virus.

In one case, the sites of vaccination suffered a great loss of substance, causing deep conical cavities, penetrating apex downward into the tissues of the arm. Several weeks elapsed before the ulcers healed. The child was of a strumous habit. On the other hand, an almost similar result occurred in the hands of another practitioner *with reputed humanized lymph*, so that one lymph was no worse than the other.

Judging from Husband, who estimates a failure of ten per cent. of primary vaccinations, the retro-vaccine is not so effective in taking as that used from capillary tubes or from arm to arm. Judged, however, by the fact that most of the virus, upon which the basis of this report is made, was used in the form of crust transported to distant places, the balance in favor of it is improved, as the chances of deterioration from heat were increased. If it were possible to hear from all who have employed this virus, a different report might be received. In my opinion, the retro-vaccine is no better than ordinary virus, except that chances of receiving other infections are lessened, and it is probably more protective.

As bearing on the question of the deterioration of the humanized vaccine virus, the following extract from a letter received in reply to the circular, is introduced, showing how thoroughly protective the virus introduced into this country was in its early ages; and is rather an argument in favor of resorting to the original sources for virus:—

"I was born October, 1800, same month first vaccine virus came to the United States, and three years after Jenner's introducing it to mankind. December, 1800, I and four others were vaccinated. Of these, only myself, and a girl aged six, had the disease. The girl is now living, and the only person I know as having as old a mark as mine by a few years. The virus was used up on us five. The operator had no more for three years. In 1823–24, I attended medical lectures in New York. Variola and varioloid were extensively raging; more fatally, however, in Philadelphia, and even such men as Drs. Wright, Post, and Valentine Mott, professors in

medical college then, had fears vaccine virus had lost its power. One morning, seventy-nine of us pupils together entered the dissecting-room. The first object we saw was a negress's body on the floor, brought in the night previous, for dissection. She had died of variola, the matter standing all over her; many pustules were broken and torn by the resurrectionists' rough hands. Us pupils began to inquire into our safety in this room, where we remained a long time. On examination, seventy-three of seventy-nine had marks of vaccine disease, five variola, and one none of either, of which he was aware, although repeatedly vaccinated. Seventy-eight then vaccinated failed to take, but all had varioloid, more or less. Five pustules or red spots showed themselves on me a few hours, and I, a little sick, was confined one day. The five who had variola, had varioloid as severe as the rest. The seventy-ninth, refusing vaccination, had genuine variola; showing us among ourselves the difference between *variola* and *varioloid.* In 1827, 1836, and 1864, I saw variola next. In 1864, in my practice, *fourteen cases*, and I alone attended all. I vaccinated myself often when exposed thus, and other times, fearing the vaccine disease would fail. In forty-five years of medical practice, I have vaccinated a great many, have tried many twice, thrice, and more times, but never could make good virus cause the vaccine disease but *once* in the same person. Have I not good reason to suppose that *vaccine virus* once fully operating on the system—as it always should—is as good a preventive of variola as *variola* itself? The trouble is, if not half, a great many that are vaccinated, don't have the *vaccine disease;* but say they have been *vaccinated*, and run headlong into danger, get VARIOLA, and then not only they, but the whole neighborhood say, it is no use to pay a doctor for vaccinating, for it is worth nothing. If every child was caused to pass through the *genuine vaccine disease* before one year old, then amen to variola, say I; not but that exceptions may occur; but they will be few and far between."

It remains to suggest that retro-vaccination can be resorted to for the purpose of securing an ample supply of virus in cases where large quantities are demanded, and in a short time. By this process enough could be shortly procured to vaccinate whole communities, if not States. As the virus is so easy to communicate, this process might be resorted to in distant and tropical climates where the supply is limited.

III. Natural unhumanized cow-pox.

"It may safely be asserted that of all the pestilences which have desolated mankind, none has been more fatally destructive than the disease popularly known by the name of smallpox. Other epidemics, indeed, may possibly have surpassed it in destructiveness for a time, while sweeping over the districts of the earth exposed to their ravages. But, their visitation over, they have departed, either never to return, or only after intervals more or less prolonged. The smallpox, on the other hand, in addition to its epidemic visitations, has permanently localized itself in every country it has visited, and, assuming an endemic character, has remained ever ready, when atmospheric or other influences favored its development and progress, to resume the more fatal form of a general epidemic, in the mean time silently carrying off a multitude of victims prematurely to the grave." (*Vide* Collinson, *Smallpox and Vaccination*, London, 1860, p. 5.)

On the other hand, if it should be shown that vaccine is spontaneously endemic throughout the country, it will manifest the goodness of the Creator in providing an antidote for every bane.

This is a rational supposition. For, if smallpox modified is cow-pox, it would be expected to find it associated together. If one is endemic, the other must be. The secrets of Nature are hard to wrest. She does not yield them to any but patient and persevering observers. The writer is not aware of any systematic efforts being made to settle this question. Still, from the facts that have come to his own knowledge, he is inclined to think that it is so, and that, if earnestly and carefully sought for, the natural spontaneous vaccinia will be found existing among cattle. The writer is the more anxious to press this point, inasmuch as certain of our own physicians have made a great deal of noise in the general public and the profession about their procuring natural non-humanized virus from France, or other foreign countries—*asserting that there is not, and never has been, a particle of non-humanized vaccine virus in the United States of North America*—except what they have imported. Such advertising sounds empirical, were it true. On the contrary, it is more creditable to a scientific profession to acknowledge the resources of their *own*, while due credit is given to *foreign* countries. Moreover, if it be a truth, and one that is generally understood by the public, that supplies of pure unhumanized, original vaccine can be found among the bovines of

civilized nations—the immortal discovery of Jenner will be doubly enhanced in its value to mankind, because it is so available.

The writer is not prepared to say that such is the case, but begs to present the evidence that he has collected, without a great deal of special effort, hoping that those who are sufficiently interested to read this article will make inquiries in their own localities, and thus settle the case.

In this connection, it may be well to state, that, among the large milk farms of Lexington, Massachusetts, the disease is considered as endemic by the farmers. They are aware of it, and cite cases of vaccination on the hand by milking affected animals, which parallel those famous milkmaids described by Jenner.

Certain barns are more troubled with it than others—for it is a trouble. The pustules occurring on the teats, generally on the hinder teats, and on the apex of the udder, are broken by the act of milking, become very sore, and the animals affected manifest symptoms of pain and distress a good deal more *striking* than the human subjects exhibit in mastitis. The irritation causes a diminution in quantity of milk, and often it has to be thrown away. The cow-pox is, therefore, much dreaded by dairymen. They have the conviction that the disease is communicated by virus that adheres to the milk-stools. The stools are subjected to processes of soaking in water, lime, and other substances, to be cleansed, and yet without avail, for the disease generally goes on till all the uninfected animals have had it.

Heifers with their first calves, and animals from other herds, are usually the subjects of the disease. The heifers because they are milked for the first time, and the others because they are newcomers.

They rarely have it twice. If the farmers' ideas are true, certainly the best method of preserving vaccine virus would be to attach it to milking stools! If the ordinary methods of conservation were as effective, it would be a great boon. The farmers have a strong conviction that the vaccine disease is entirely independent, and has nothing to do with smallpox. They occur without regard to each other.

"Primary vaccine lymph exists in Belgium as well as in other countries.

"To obtain a due supply of cow-pox, the government should accord premiums to the proprietors of cows who promptly make known the existence of true cow-pox.

"Rewards should also be decreed to medical and veterinary practitioners, who by their zeal contribute to its discovery and propagation."[1]

Spurious Cow-pox.

There is no doubt but that this is mistaken by the farmers for the genuine. It is contagious, but its phases are different, last longer, and produce a different pustule. Horny-pock are found common. On the other hand, it is equally certain that the genuine cases are not uncommon. The test is applied by vaccinating with the suspected virus another animal, and watching the result. Jenner's method of testing was to vaccinate persons, and then try INOCULATION. It cannot be done now. If the bovine vaccination takes, then we feel justified in trying it on the human subject. One great difficulty in the way is to obtain the virus at the right time. Jenner's discovery of the phases of virus is of very great value here. Something can be judged by the fluidity and limpidity of the lymph as to the right time for insertion of the lymph. A better plan is to wait for the falling of the crust, which is also difficult, as the milking process must go on, or the cow dry up; and it is this severe friction which disturbs, detaches, and probably interferes with the proper development.

The number of pustules varies from one to a hundred. Instances have been known where the pustules have been communicated to the mouth of the calf who suckles, showing an analogy to the variola. The writer has seen many cases of spurious cow-pox, of which he has kept no record. The following may serve as an example:—

Case of Spurious Cow-pox.—Probably (because the lymph may have been taken at the wrong time).

1872, April 2. On the left hind teat of a heifer with her first calf, near the commissure of the teat with the udder inside, was formed a large flattened, non-umbilicated, very white pustule, from which, on the morning of the day mentioned, the milker stated that a large quantity of matter was discharged on his hand. By careful scraping, several ivory points were charged, and two of Husband's capillary tubes.

A fine Dutch heifer was vaccinated with this lymph near the

[1] From Report of Belgium Acad. of Medicine on Vaccination, *Vide* Amer. Journ. Med. Sciences, July, 1858, pp. 221, 222.

crucial commissure, and my brother, Mr. W. R. Cutter, was instructed to watch the animal from day to day.

8th. Report that the matter is taking.

9th. Found nearly all the spots of insertion occupied by prominent, sharp, conical vesicles, except two or three, which were flattened and indistinctly umbilicated. The tips were occupied with very white matter. The animal was kept tied up. There was no well-formed crust on the heifer from which the supposed virus was taken.

16th. The pustules seem to be nearly the same as on the 9th. No sign of any crust; and, what was more singular, there were about a half dozen of clear, horny crusts upon the teats of the animal.

22d. All died away.

Case 2. A portion of crust from the teat of a healthy cow was rubbed up, and vaccinated into two fine healthy cows, with no result. At first the places looked as if taking, but all faded away subsequently. It is very possible that this crust was taken at the wrong time, or was impaired by the friction of milking. Other examples might be cited, but the above must answer. To one who has had the experience of the writer, with retro-vaccination, the failures of this supposed virus were very apparent. They were as unlike the reproduced disease as rupia or pemphigus.

Case 3. While these experiments were in progress, my attention was called to what the proprietors thought were truly genuine cases of the disease. There were two animals, fine creatures, with handsome udders and teats. All four teats were covered with an eruption that closely resembled the desiccated stage of vaccinia. There were, perhaps, fifty hard, horny crusts on each animal. When removed, they were diaphanous and amber colored, and closely resembled a crust from a child's arm. These were tested on three animals, in every case without any success.

Natural Spontaneous Cow-pox Vaccinia.

Case 1. About 1850, Dr. W. J. Currier, of Lexington, Massachusetts, observed on a cow belonging to Mr. Pelatiah Pierce, of Lexington, about one hundred pock, clear, lustrous, umbilicated, and perfect pustules, on a remarkably clean and fair-skinned udder. He took quills, and vaccinated himself and two infants. The children took well, and had a perfect, but severe disease. His own insertion did not take.

Case 2. A similar case has been in Woburn, at the farm of Mr. John Weston, sometime after the above. A milker was vaccinated in his hand.

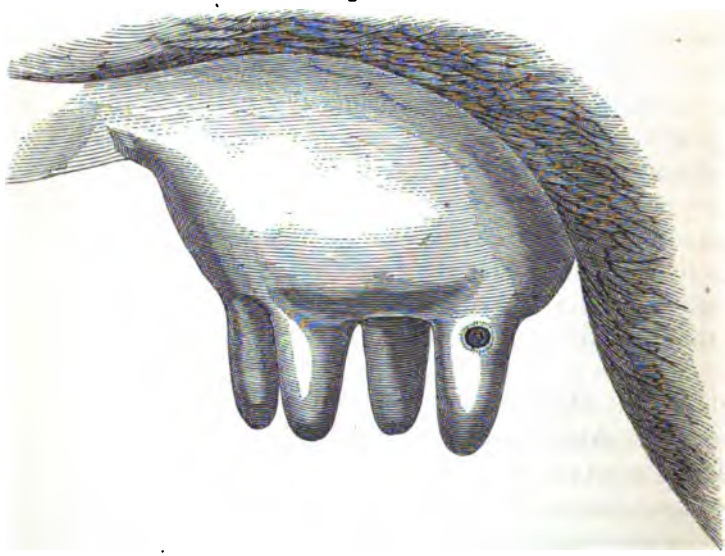
Case 3. My own, detailed above in the report of Surgeon Milhau.

Case 4. That of Dr. John Yale, of Ware, Massachusetts, detailed above (*vide* page 216).

Case 5. Several cases reported by Dr. Hilburn Darlington, of Concordville, Delaware County, Pennsylvania.

Case 6. *Vide* Trans. Medical Soc. of the State of California, 1872, p. 236, Henry Gibbons, Sr., report on Practical Medicine: "*Vaccine Endemic among Cattle.*—In the winter of 1870 '71, an endemic of kine-pock appeared among the cattle on the Point Reyes Ranch, in Marin county. For a long time its nature was not suspected; but, coming to the knowledge of some professional men in San Francisco, it was made a subject of investigation by them, and its true character fully demonstrated. The virus procured from the diseased cows was introduced in the human system, and developed the true vaccinia. To Drs. R. McMillan and J. B. Trask, of San Francisco, is due the credit of the discovery and the experiments."

Fig. 2.



Supposed natural Cow-pox.

Case 7, *Supposed.*—Cow in my own barn. Disease discovered April 19, 1872. There was but one pustule, situated near the

commissure of the left hind teat with the udder—outside front aspect. It was raised, about one-fourth inch in diameter, circular, umbilicated, black on the central parts from foreign substance adhering. The periphery was whitish, nacreous color. Seen by Drs. Currier, of Lexington, and Drew, of Woburn, it was pronounced a perfect specimen. It was concluded best to allow it to mature undisturbed. It is undergoing this process at present.

Case 8. Occurred in 1867, in the northern part of Wilmington, near the Tewksbury line, on a cow, the property of one Mr. Phelps. This matter was tested and employed by Dr. Jonathan Brown, of Tewksbury State Almshouse, with reported perfect success. Owing to the death of both the parties, the information came through Mr. A. G. Carter, of this town.

Case 9. A gentleman at this Session (Amer. Med. Assoc., Phila., 1872) reports a case of spontaneous cow-pox at Reading, Pennsylvania.

IV. Conservation of vaccine virus.

This is one of the most troublesome things to accomplish well. If vaccine virus would keep by the ordinary methods, as well as it does in the instance cited at Lexington, where it is preserved on the milking stools, there would be no occasion for the remark just made.

Heat over 80° Fahr. and moisture are the great destroyers, both combined. On the other hand, cold and dryness are favorable for its preservation.

Freezing.—This process does not impair the virus. On several occasions while vaccinating kine in cold weather, I have had the virus freeze so as to require thawing, and yet prove efficient in the vaccination process.

There is no doubt but that the vaccine direct from kine loses its properties sooner than the humanized. Sometimes it seems as if the heat of the animal's body destroyed it. It is not always so. For on one occasion I vaccinated three cows with virus from another cow which had remained on seventeen days. The crusts were somewhat brittle but diaphanous. They took finely. On the other hand, a humanized crust kept in a bottle for three years and then used, proved ert. So vexatious and curious a matter is this. The writer has spent a great deal of effort, thought, and study, to perfect means of surely preserving, and has failed.

Liquid Lymph.—The best method for long conservation is that of Husband's capillary tubes, made in Edinburgh. These are good for any climate. I don't approve of the French bulged tubes.

Dried Lymph.—Best preserved on ivory points made by the late C. B. Rogers, of Deep River, Connecticut.

The method of enclosing dried lymph between two squares of window glass, sometimes proves very effective. A story was told of a medical officer who took out from England such a supply to India. A square got secreted in a writing desk. After a sojourn of seven years in that tropical climate, the officer returned, taking with him his desk. The virus was then discovered, employed, and found effective.

Crusts may be preserved in (1) wax; (2) gutta percha; (3) tin foil; (4) India-rubber; (5) or my method; two metallic saucers, one-half inch in diameter, one-sixteenth deep, surrounded by a ring of India-rubber; (6) glycerine.

Surest method to have reliable virus is to vaccinate a fresh child or animal, from week to week. This method is employed by Dr. G. L. Simmons, of Sacramento, California, with unvarying success in the case of humanized virus. The disease is in cultivation all the time. It deserves an extensive adoption by all who wish to vaccinate surely and thoroughly.

Glycerine.—"In a recent communication upon the subject (Berlin K. Woch., Sept. 25, 1871), Dr. Muller points out that the purity of the glycerine employed is of great importance, and that those practitioners who have complained that the preservative power is only of a short duration have probably employed an impure article. In his hands, lymph after being kept two years has produced normal pocks; and in this way he has been able to store up in the Berlin Vaccine Establishment supplies of reliable lymph sufficient for vaccinating thousands of subjects. Dr. Muller considers that glycerine facilitates the operation of vaccination; dilution of the lymph by its aid producing a far more efficacious and much more intimate and easily employed mixture than when water is employed."

V. Methods of vaccinating.

How to Vaccinate with the Crust. *Lancet Method.*—Produce crucial abrasions of the cuticle in two spots on the arm with a lancet, by making four vertical parallel scratches, half an inch

long and one-eighth inch apart; cross them with other four like scratches, by scratching the spots in different directions until the cuticle is denuded. Then lay on the spot a portion of the crust which has previously been rubbed up on a vitreous or ivory surface to the consistency of cream; prick it in, and expose the spots to the air till dried; or moisten a portion of the surface of the crust with water; rub it in with the lancet until a portion of the crust is scraped off, and apply this to the abraded cuticle as above. (Martin.) Or, cut from the crust a small triangular section, and insert it under the cuticle, in a little pocket made by the lancet point; cover up with adhesive plaster, and allow it to remain not less than two hours.

Instrumental Method.—Having rubbed up a portion of the crust as directed above, charge the point of the automatic vaccinator, made by Codman & Shurtleff, Boston, and insert the charge into the arm by simply depressing the lever of the instrument. It is necessary to hold the skin tense, and to press the instrument lightly but firmly. Expose the spots to the air till dried. These methods answer for ordinary cases. The following are for difficult ones:—

Blister Method.—After the cuticle has been raised by means of blistering with either empt. cantharides, cantharidal collodion, ammonia, hot water, or heated wire (nail head), puncture the bulb, wipe off the serum, and then lay on a portion of the crust, rubbed up with water. This is very sure. The virus is introduced through the absorbents. The writer has succeeded with it after many physicians had failed.

Croton Oil Method.—Proceed as in the lancet method, and on the next day rub in on each spot one drop of croton oil. This method was first used by a layman. With it he succeeded in making his family take, after his family physician had failed. It is the most sure method that the writer is acquainted with. The croton oil produces an inflammation which excites the lymphatics to activity, and also affords a nucleus for the contagion.

There are other very deserving instruments for introducing virus, but the automatic vaccinator excels in the fact that *one motion only* is required to insert the matter.

How to Vaccinate with Lymph. *Liquid Lymph.*—Husband's tubes. Break off both ends of tube. Place one end in the mouth and blow the lymph out on to the arm, and then prick in with

lancet point, or Whittemore's vaccinator, and expose to air till it is dry.

Or blow the lymph on to the lancet point, make V-shaped abrasions covering each other, and then wipe the lymph on to the abrasions.

Or blow the lymph on to a finger-nail, portion of glass, or crockery surface, then apply by lancet. A tube should not be used at separate intervals without resealing. The process is somewhat thus. Take tube gently between the right thumb and finger like a pen—the charged end being uppermost and the other downwards. Strike the ulnar edge of the right hand with a gentle shock on the radial edge of the left hand. The virus will then joggle down towards the empty end; when it is midway the jogs should be stopped. Seal by putting the end, which is moistened by the lymph, into a flame of lamp or match, until sealed. Then reverse tube—introduce the other end half an inch into the flame. Quickly withdraw till the point is just within the flame, and hold till it is closed.

Probably the surest method is the first named.

Dried Lymph on Quill or Ivory Points.—Make V-shaped abrasions and rub the charged point in.

Or make the abrasions with the Whittemore vaccinator.

It is desirable not to employ any points over a week old, though I have known them to succeed two months old; Dr. Currier a year.

VI. Nature of vaccine virus.

This report would be incomplete unless some allusion was made to the important researches of Salisbury and Hallier. They both have found microscopic vegetations in vaccine virus—human and non-human. Hallier has cultivated both vaccine lymph and variola on lemons, white of egg, starch moistened with solution of phosphate of ammonia. We append the results of the culture with micrococcus of smallpox.

"*Result of the Cultures with Micrococcus of Smallpox.*—The result of the above cultures, nearly the same as that from the lymph of the vaccine disease, is remarkable, viz., that under the same circumstances, and from the same soil, the same generations or their morphisms appeared; *i. e.* on a dry disinfected plant soil, stand aspergillus and eurotium; on the fruit-peel of the lemon, cladosporium-stemphylium; on dry soil rich in nitrogen Torula

rufescens, Fres., with macroconidia from which come Mucor mucedo, Fres. But we cannot immediately, on the fruit-rind of the lemon, get pycniden from the micrococcus of kine-pock; it is to be first cultivated on a nitrogenous soil (white of egg), and then transplanted on the lemon.

"While the infection with the vaccine-fungus probably belongs to Torula rufescens, Fres., which is to be considered as the younger progeny of ustilago carbo, the micrococcus so abundant in milk and even in colostrum, that of the smallpox probably proceeds from the micrococcus which is developed from schizosporangia (sporidesmium-stemphylium), and which always makes its appearance in company with pycniden.

"This result is, therefore, of the greatest practical importance, because the action of vaccination is perhaps thus best transmitted, when kine-pock and smallpox are derived from the same fungus; to guard against the smallpox is nothing else than to infect with the same disease, if the micrococcus is the contagion. The great mystery of vaccination is thus explained—that one who has had the smallpox cannot have it a second time."[1]

"*Result of the Cultures with Vaccine Lymph.* The fungi-forms which come from the micrococcus of kine-pock matter, by means of sporoid-forming and sprouting of sporoids, belong altogether to one species, and form the generations:—

1. Of Acrospore: Aspergillus glaucus, Lk.
2. Of Thecaspore: Mucor Mucedo, Fr.
3. Anaërophytic spores: Ustilago carbo, Tul.
4. Fructification: Erotium herbariorum.
5. Pycniden, and its subordinate morphisms: Oidium lactis; Torula rufescens, Fres.; Ascophora elegans corda, Botrytis oidium albicans (cladosporium), Jonesii Berkley.

"Compare with these the next related fungi-forms:—

1. Of Acrospores: Penicillium crustaceum, Fr.; Botrytis elegans corda.
2. Of Thecaspores: Mucor racemosus, Fres.; Rhizopus nigricans, Eh.
3. Anaërophytic spores: Tilletia caries, Tul.; Tilletia (lolii Tul.).

[1] *Vide* Hallier, Parasitological Investigations on Vegetable Organisms. Pub. Mass. Med. Soc. (1872), pp. 320, 321.

4. Fructification: Achlya, prolifera, Prings; Pleospora herb. Tul.

5. Pycniden.

"That the morphism shows also a resembling parallelism is evident.

"But the question is, which generation or morphism furnishes the micrococcus of kine-pock? First of all, one affirms, with some assurance, that mucor mucedo and pycniden have nothing to do with these micrococci, because they do not spring up directly from them, not even on a favorable soil; nevertheless they readily appear sometimes as soon as the micrococcus has vegetated on nitrogenous soil, and after that on dry soil (cork and lemon). Aspergillus and eurotium hardly furnished kine-pock micrococcus, for they form, in liquid, as I could often show for aspergillus, very active micrococcus, and closely, as with penicillium, by means of the continued division of spore-nuclei and bursting of the spore-wall; but this micrococcus is quite colorless, not from wine-red to reddish-brown color as that from kine-pock. Torula rufescens, Fres., forms a reddish-colored micrococcus. I have for a long time shown this fact, but yet the matter would be better proved by new experiments; and, therefore, torula rufescens was first sown on various liquids, and then on boiled human excrement and boiled neat's flesh.

"The forming of micrococcus was energetically going on upon nitrogenous soil. The discharge of the manifoldly divided nucleus is, as was above figured, concerning aspergillus. The micrococcus is deep red, especially when seen in mass. From the hard nitrogenous soil the Torula sprouted and developed Macroconidia and Mucor mucedo, Fres., with sporangia, sporangiola, and panicled botrytis.

"Further I sowed ustilago carbo, Tul., on the same substances.

"The micrococcus I have already described, which have no resemblance with them in color, but are always dark brown.

"On the flesh and fæces the sprouts formed Torula chains, afterwards Macronidia and Mucor mucedo, Fres. Thus it appears evident that the Torula rufescens, Fres., furnishes the micrococcus of kine-pock. Now it is of the greatest interest, that this fungus appears very abundantly in milk, perhaps always in colostrum. I have shown, in the case of swine, that the micrococcus in colostrum for the most part belongs to Torula rufescens, Fres. Rarely if ever does primary kine-pock show itself upon oxen, and in cows

it is mostly confined to the udder; hence the conclusion that the cow becomes infected from its own milk, which conclusion is strengthened by the fact, that the disease most frequently occurs upon the cow's calving.

"It is now my duty to state, as I learned by correspondence with Dr. Bender, of Camburg, that this distinguished observer, in 1859, had seen the vegetable organisms in smallpox; that he arranged the first culture, and that his experiment was rewarded with success.

"He wrote me, November 3, 1867, as follows: 'As in the year 1859, compulsive revaccination was ordered, the peculiar form which was observed, brought me to the view, that in and with smallpox matter there must be a vegetative process; and, therefore, I commenced microscopic observations of the lymph, which I had in abundance. Commonly I found, beside the usual morphologic elements, as epithelium-cells, flakes of filamentary stuff, little hairs, etc., fragments of sharply-defined hyaline threads of .009 m. in breadth, and of variable length; twice there were seen larger balls, in great numbers, in the matter of the smallpox pustule, which, on the employment of a solution of potassa, ether, and ammonia, proved to be spores.

"'A small drop of vaccine lymph with sweetened water was placed in warm air, which had been filtered through cotton; four days after, a multitude of quickly moving points appeared, whose motion was stopped by acetic acid. Fourteen days after, I succeeded in raising threads which greatly resembled the oidium of aphthæ.'

"Dr. Bender, nine years ago, obtained a morphism of smallpox fungi by culture, and the entire conformity of results from experiments instituted at various times, certainly speaks well for their certainty and correctness. For Dr. Bender, from his cultures, obtained no other thing than Cladosporium belonging to Aspergillus, Ustilago, Eurotium, and Mucor mucedo, Fres."[1]

Salisbury, Vegetation Variola, and Vaccina.—"I have given to the entire plant in all its phases of growth the name *Ios variolosa vacciola;* to the fungoid phase, *I. variolosa;* and to the algoid phase, *I. vaccola.* I have given these names to the two different phases of this vegetation, for reasons which will hereafter appear.

[1] Hallier, Parasitological Investigations, etc. Pub. Mass. Med. Soc. (1872), pp. 314–317.

"In smallpox, this vegetation develops in all its phases. If the vegetation of a smallpox pustule be inoculated into a person who has never had variola, the same contagious disease, in a modified form, and the same vegetation are produced. This vegetation is the *Ios variolosa vacciola.* If, however, the matter of smallpox be inoculated into the cow, a pustular disease is produced, resembling that of variola, but the eruption will only be found to contain the algoid stage of the vegetation, on which account we have given to this stage of its development the name *Ios vacciola.* The fungoid phase of the plant is not produced in the cow.

"If now we take the matter from the pustule of cow-pock, and inoculate it into the human subject, we produce a pustule like that of vaccina and variola, but it contains the stage of the vegetation only that is found in the cow-pock sore.

"Another interesting fact is noticed, namely, that the vaccine pustule does not transmit the disease from one person to another, except by inoculation. The vegetation in this stage seems to have no, or at least but little, power to penetrate the epithelial envelop that invests the body inside and out. The other form of the vegetation, however, which is developed in smallpox, acts as an active contagion, and when the spores fall upon epithelial surfaces that have not had the impress of immunity stamped upon them by a previous invasion, they penetrate to the deeper tissues, and pervade the entire organism, the result of which is the pustular eruption called smallpox.

"These facts are extremely interesting, throwing a flood of light upon some singular features of the disease.

"That the plant in its perfect state does not develop in the cow, while the algoid phase of growth finds in this animal a fertile soil, is highly instructive and significant, and may lead to interesting and valuable results in obtaining matter in other contagious and infectious diseases, that may impart without danger an impress of immunity by inoculation.

"This whole field is one of the greatest possible interest, and is full of rich rewards for the patient and careful student."[1]

[1] J. H. Salisbury, M.D., Microscopic Examinations of Blood: and Vegetations found in Variola, Vaccina, etc. (New York, 1868.) Pp. 48-50.

Conclusions.

First.—Vaccine virus has been developed in this country by inoculating kine.

Second.—Vaccine virus has been reproduced by retro-vaccination in this country with success.

Third.—The spurious cow-pock first described by Jenner is frequently observed in this country.

Fourth.—The natural non-humanized cow-pock is endemic in this country, and only needs looking up to be discovered. It is, therefore, unnecessary to levy foreign countries for such virus.

Fifth.—The recent researches of Salisbury in our country, and Hallier in Germany, into the ultimate nature of cow-pock and smallpox shed great light on the subject, and deserve a careful and painstaking series of similar inquiries on the part of unprejudiced and competent observers. The confirmation of these gentlemen's statements would be nearly as great an addition to our knowledge as the original discovery of Jenner.

Sixth.—Except as regards purity from syphilitic taint, the virus from the cow has no special claims above the carefully selected humanized virus in ordinary use. But a resort to the animal vaccination gives an opportunity to procure at all times a supply of vaccine almost unlimited in quantity.

REPORT OF THE SECTION

ON

Medical Topography, Meteorology, and Epidemics.

REPORT OF THE SECTION

ON

MEDICAL TOPOGRAPHY, METEOROLOGY, AND EPIDEMICS.

THE Section on Medical Topography, Meteorology, and Epidemics, respectfully report, that members of the Committee in several States have submitted records and reports relating to the subjects designated in the title of this Section of the Association. All of these papers have been carefully examined, and the Section refers to the Committee of Publication the following:—

A Report on the Sanitary Topography, Climatology, and Epidemics of West Virginia (being a Second Report), by E. A. HILDRETH, M.D., of Wheeling.

A Report on the Climatology and Epidemics of South Carolina (including a Report upon the Yellow Fever and the Dengue in Charleston in 1871), by MANNING SIMONS, M.D., of Charleston.

A Report upon the Climatology and Epidemics of California, by F. W. HATCH, M.D., of Sacramento.

A Report upon the Climatology and Epidemics of Delaware, by L. P. BUSH, M.D.

The Committee on Epidemics appreciates the responsibility which devolves upon it, under the rules of the Association, in regard to the preparation and publishing of papers pertaining to the work in this Section; and, as it has been customary, in the past twenty-five years, for the contributors of reports in this Section to present very extended and voluminous details relating to the physical geography of the various States, and the course and characteristics of the diseases observed, it has at length appeared desirable to devise some method that shall, if possible, secure in a

compact and comparable form a large amount of freshly observed facts concerning the epidemic phenomena and etiological history of prevalent diseases in every portion of the United States.

With the design to promote such observations, and to secure the recorded results of them in a compact and acceptable form, for the benefit of the Association and the advancement of medical knowledge and the practical applications of hygiene, this Section is now preparing a concise schedule of points to be observed and recorded in the history and characteristics of epidemics and of epidemic phenomena in general. Such schedule, when perfected and sent forth by the Section, it is hoped will serve to bring into a compact form a much more comprehensive and acceptable record of epidemics and epidemic phenomena than has hitherto been practicable in this Association. This duty is to be performed without cost to the treasury of the Association.

Though the natural laws that determine the rise and prevalence of epidemics and epidemic phenomena may, in the present state of knowledge, be incapable of perfect definition, there is much reason to believe that the chief facts can be as well observed, and so comprehensively studied, that by this labor the foundations of more exact knowledge concerning the causation and the epidemic phenomena of diseases shall be extended by contributions of this Association.

GEO. L. SUTTON,
Chairman.
E. HARRIS,
Secretary.

Report in behalf of the Section on Climatology and Epidemic Diseases of the American Medical Association.

At the recent meeting of the American Medical Association, the Section on Medical Topography, Climatology, and Epidemic Diseases, having more papers and reports referred to it than could be read and fairly disposed of during the Session of the Association, referred two reports to the undersigned, as a sub-committee of the Section, with instructions to examine and report on the same to the Committee of Publication. One of these reports was presented by Dr. W. F. THOMS, of New York, and the other, by Dr. GEO. W. LAWRENCE, of Arkansas.

Both these papers have been carefully examined.

The report of Dr. THOMS is made up mostly of tabular state-

ments concerning the latitude, longitude, surface area, and population of several counties in the State of New York, such as might readily be gathered from the Census Reports. There is no allusion to any epidemic, or to any such new facts as would bring the paper within the rules of the Association regulating the references to the Committee of Publication. We, therefore, recommend that the said report be returned to its author.

The report of Dr. LAWRENCE contains much of interest in relation to the climate and diseases of Arkansas, with much, also, that is irrelavent. We recommend the reference of the report to the Committee of Publication, with the request that all such parts as are crossed by pencil marks shall be *omitted* in the publication. We also advise the printing of the meteorological tables, and the most complete of the geological maps, with the isothermal map, at the end of the report. All of which is respectfully submitted.

N. S. DAVIS,

In behalf of the Section on Climatology and Epidemics.

June 30, 1872.

SECOND REPORT

ON THE

CLIMATOLOGY AND EPIDEMIC DISEASES OF WEST VIRGINIA.

BY

E. A. HILDRETH, M.D.,
WHEELING, WEST VIRGINIA.

SECOND REPORT ON CLIMATOLOGY AND EPIDEMIC DISEASES OF WEST VIRGINIA.

PHYSICAL GEOGRAPHY.

WEST VIRGINIA forms a section of the range of mountains which extend from Maine to North Carolina.

In Maine, their altitude is 5300 feet; in New Hampshire (White Mountains), 6620 feet; in Western Pennsylvania, 2700 feet; in West Virginia (at the crossing of the Baltimore and Ohio Railroad), 2620 feet; at source of Greenbrier and Cheat Rivers, 2440 feet; near White Sulphur Springs (at crossing of Chesapeake and Ohio Railroad), 2000 feet; at Peter's Mountain, southeast boundary of West Virginia, 2650 feet; at Black Mountain (North Carolina), 6476 feet.

It will be observed that the elevations of the Allegheny Ridge, within West Virginia, are an average of 4122 feet below the highest points on the north and south.

There are good geological reasons for believing that they were once of equal height, before their summits were worn down to their present levels. Two or three distinct upheavals, or epochs, mark their strata.

Tracing a course from the southern to the northern limits of the State, by a line parallel to the eastern boundary line, and thirty or forty miles west of it, is a continuation of the Cumberland Range of Mountains, and known as Tug Ridge, Flat-top, Cotton Hill, Gauley, and Rich Mountains, and Laurel Hill; between these parallels would be included the counties of McDowel, Wyoming, Mercer, Raleigh, Monroe, Greenbrier, part of Fayette, Nicholas, Pocahontas, Grant, and Mineral; beside Pendleton, Hardy, and Hampshire, lying east of the Allegheny Ridge.

Now these fourteen counties include our highest table-lands.

The numerous branches of the Great and Little Kanawha, Youghioghany, and Monongahela Rivers have their source here,

and empty their waters into the Ohio; whilst the three counties named on the east are traversed by the branches of the Potomac. For our present purpose this division may be termed the *Mountain District.*

The system of hills or section lying between this district and the Ohio River, or western boundary, may be called the *Ohio Valley District.*

In the *Mountain District,* the lowest valleys on the east and west of the Alleghenies, are from 1000 to 1200 feet above the sea-level. The average difference of arable levels *within* this district is over 1400 feet; which allows of considerable variation of climate, temperature, and production. Although designated as mountains, they are in reality summit plateaux, or table-lands, declining towards the west by successive benches half-way across the State, with occasional interruptions of smooth knob-like elevations, and deep cuts, made by the rapid watercourses traversing them. Except at Hawk's Nest, in Fayette County, the passage of Tygart's Valley and Cheat Rivers through Laurel Hill, New River through Gauley Mountain, and the Potomac through the Blue Ridge, at Harper's Ferry, there is almost a total absence of precipices or other evidences of the violent action of the waters. "Here undulating plains, which, but for their majestic timber, would recall to mind an Illinois prairie, reach along the mountain summits for miles in length and breadth, with scarcely here and there a swell sufficiently bold to divide the waters."[1]

These high lands do not appear from actual observation to be as great disturbers of the conditions of climate as their altitude would imply. The temperature of their *interior valleys* does not differ much from the tide-water region of Virginia on the east, or the plains of Ohio or Indiana on the west, along the same parallels of latitude.

The air of this region is of great purity and freshness, and is thus described by another: "The traveller upon ascending it, if not absorbed by the novelty and grandeur of its almost primeval scenery, is impressed with the singular dryness and purity of the atmosphere, the crystal limpidity of the springs and streams, and the tonic bracing effect of the mountain air at all seasons of the year: the sensation is one of buoyancy of spirit and sudden relief from the cares of health and fears of premature death—in fact, the

[1] Dodge, West Virginia Farms.

most remarkable instances of human contentment and longevity in the State are found in the settlements of this mountain range."

THE OHIO VALLEY DISTRICT.

The natural features of this section are a system of billowy hills and winding valleys. There is a gradual diminution in the height of the hills, from the northern to the southern part, as also a like declension from the east to the west. The altitude of this section would fairly represent the *mean level of the State*, which would be between 900 and 1000 feet above the level of the sea. The following measurements will exhibit the configuration of this district: the height above tide-water, at the Pennsylvania line, is 675 feet; at Wheeling, 640 feet; at Parkersburg, 625 feet; at Point Pleasant, 560 feet; at Mouth of Big Sandy (State line), 537 feet; at Charleston (Kanawha), 600 feet; at Grafton (Tygart's Valley), 1000 feet; hence, the average elevation of this district is very nearly 700 feet. Average difference between the Ohio valley, and the highest table-lands of the Mountain District, 1725 feet.

By a similar calculation, the average difference of level, between the Ohio River bottoms and the lowest mountain valleys, is about 400 feet.

The streams, descending from the table-land westward, lose their characteristics of mountain torrents as soon as they attain the general level of their valleys; their currents subsiding to a gentle flow, with only an occasional ripple to mark the gradual decline. The grade of descent of the Ohio River, along the western boundary of the State,[1] is, "from Pennsylvania line to Wheeling, 9.5 inches per mile; Wheeling to Marietta, 6.53 inches per mile; Marietta to Setart Falls, 6.17 inches per mile; Setart Falls to mouth of Great Kanawha River, 7.2 inches per mile; Great Kanawha to mouth of Big Sandy River (State line), 6.1 inches per mile.—Total, 35.50 inches."

This grade is for a distance of two hundred and fifty-three miles, or the entire western boundary of the State.

The tributaries of the Ohio have, in proportion to their size, almost precisely similar grades, after their descent from the mountain plateaux.

The *hills* have smoothly rounded tops and sloping sides, very

[1] Chas. Ellet.

seldom showing any appearance of jutting crags, or rocky declivities, to prevent easy ploughing or the use of a modern mower in cutting grain or hay. Indeed, as fertile and productive farms may be found upon the tops and sides of the West Virginia hills, as in any other part of this country.

Such being the general configuration of the surface, it necessarily has a drainage which could not be improved by art; no chance for stagnant waters, or other conditions known to generate malaria. Although the Ohio River bottoms, in some places, decline from the river towards the base of the hills, allowing the formation of a pond, yet the value of the ground of late years has made it profitable to prevent such accumulations by proper ditching.

GEOLOGY.

The limits of this paper will only allow a general outline. "The strata of the Appalachian region of the State exhibit numerous, successive, and generally abrupt undulations, and prolonged lines of parallel anticlinal and synclinal mountains and valleys, disposed in alternating arrangement upon its surface. These anticlinal axes towards the west preserve a parallel direction with those of the Appalachian belt, giving rise to ranges of mountains less elevated above the general level of the surrounding region, broader, and less abrupt in their declivity, than the ridges formed by the more steeply inclined strata of the Appalachian portion of the State. Along the summits of these broad mountains, the rocks appertaining to the coal formation, once evidently continuous in its extension over the inferior strata, have been more or less removed; and thus over their undulating tops, and in their profound ravines and river gorges, the upper groups of the strata belonging to the Appalachian series are not unfrequently deeply and extensively exposed.

"The destructive rush of waters, attested by the removed summits and gashed sides of these broad ridges, after tearing away the stronger materials above, has met with far less resistance from the soft shales and sandstones forming the interior mass. Hence originated the deep valleys and abrupt hills between the flanks of these ridges; and the deeply scooped channels of those streams, not merely permitted to pass through, but meander for great distances along the central line of the axis, and in the very heart of the mountain whose interior structure they disclose.

"Of the features here described, numerous exemplifications are met with towards the northern limits of the State, while, in the districts lying further west, the few low undulations which occur ultimately become lost in the gentle inclination of the strata towards the valley of the Ohio. Hence, throughout this more western portion of the area occupied by coal strata, even the uppermost of the Appalachian rocks are not met with upon the surface, or in the deepest natural or artificial exposures. In the region of Parkersburg and Point Pleasant, the rocks belonging to the principal coal measures become buried, giving place upon the surface to shales, slates, and sandstones; rising again further west, in the State of Ohio, and bringing to view the counterparts of the lost coal seams, and their associate beds of sandstones, slates, shales, iron ores, and limestones, in an order the *reverse* of that in which they had been seen to disappear in West Virginia, some distance east of the Ohio River. In this wide-spread series of rocks, and beyond this belt of productive coal measures in Ohio, along the valley of the Scioto, appears a group of under-lying, east-dipping sandstones, slate, and limestone, corresponding to our upper Appalachian formations. In one wide view of the whole series of strata lying beneath the coal rocks, and leaving out the undulations, previously alluded to, towards the eastern margin of the tract, we are presented with a *vast synclinal trough or basin* spreading from the eastern escarpment of the coal rocks in West Virginia entirely across the State, and eastern half of Ohio, and terminating there in a similar escarpment, in which the rocks are seen inclining towards the east, to meet their counterparts dipping in an opposite direction in West Virginia.

"To complete this general outline, the eastern and western margins of this basin, parallel about midway, gradually approach each other towards the north, which bending around, the former in Pennsylvania and the latter in Ohio, actually coalesce and form the head, or northern termination, of a great trough or basin; as a result of this junction, the whole series of rocky strata have here a dip or inclination towards the south.

"Now, the head of this basin is a short distance north of the northern limits of West Virginia, so that the Ohio River, along this portion of the tract, intersects the southerly dipping strata of limestone, coal, and sandstone (as was shown in a section of Chapline's Hill in our previous report), and, although flowing in a general direction from northeast to southwest, yet its frequent and important

changes of directions and flexures expose nearly all the series of strata forming the basin, until it emerges from the trough near Portsmouth, Ohio, and pursues its way through the Appalachian strata lying to the west."

After this general outline, compiled from Prof. Wm. B. Rogers' *Report of Geological Survey of Virginia*, we insert from the same able Report his

Section of Vineyard Hill.

On Kanawha River above Charleston—ascending order:—

No. 1. *From the Bed of the River to the lowest Coal-Seam*, 54 feet.

The lowest portion of this height for 5 feet is gravel and water-worn pebbles, among which may be found not only the rocks of the Appalachian region, but also those of the Blue Ridge. Resting on this is *yellow argillaceous* and *sandy clay* and *vegetable mould*, forming the surface of the Kanawha bottoms, twenty-five feet. Above this, and forming the immediate base of the hill, is *gray micaceous sandstone*, composed of alternating layers of hard compact and soft fissile rock.

No. 2. *Bituminous Coal*, 6½ feet.

This is the most important seam in the whole series. It rests upon a thin stratum of slaty sandstone, crowded with fragments of coal plants.

No. 3. *Bluish Drab-colored Slaty Shale*, 40 feet.

The slate resting directly upon the coal includes a thin seam of nodular iron ore, in flattened ovoid masses. This is the heaviest bed of slate along the whole line of the Kanawha as far down as Charleston.

No. 4. *Bituminous Coal*, 1½ feet.

No. 5. *Argillaceous Sandstone*, 200 feet.

This rock is extensively quarried for the construction of salt-furnaces. It abounds in fossil plants.

No. 6. *Bituminous Coal*, 3½ feet.

No. 7. *Siliceous Sandstone*, 215 feet.

This vein sinks below the bed of the river near Charleston.

No. 8. *Bituminous Coal*, 4 feet.
Hard and somewhat slaty in structure.

No. 9. *Siliceous Rock, Blue or Black Flint*, 7 feet.
On top a thin band of impure iron ore.

No. 10. *Coarse Siliceous Sandstone*, 140 feet.
Disintegrating easily, containing argillaceous and siliceous bands, the latter fossil ferns.

No. 11. *Reddish and Yellow Shales*, 10 feet.
This forms the capping of the hill, the lower portion contains masses of argillaceous iron.

Total, 680 feet.

SOIL AND PRODUCTIONS.

The area of the State is 32.092½ square miles, or 20,539,225 acres. Of this quantity, by the census returns for 1870, there are "2,580,-254 acres improved or farmed, 4,364,405 acres of woodland, and 1,583,735 acres unimproved."

"The proportion of *alluvial or bottom land* throughout the State has been estimated at 30 per cent." This constitutes the most fertile portion, and is composed of sandy loam, clay, gravel, and vegetable mould. The chief part of this surface, originally covered with a dense growth of forest trees and undergrowth of shrubbery and vines, is now successfully cultivated. The soil of the *hill-sides* is composed of alumina, lime, silica, magnesia, iron, and vegetable mould.

The general depth of this soil is from one to twenty feet, and in point of fertility but little inferior to the bottom lands.

The *hills* are cultivated from the base to the very summit, and produce cereals, esculents, fruits, hemp, flax, sorghum, and tobacco, equal to any of the States in the West. Cotton and rice have been grown south of the Kanawha River with moderate success. The dairy, stock-farming, sheep-husbandry, fruit growing, and grape-culture, form the chief agricultural industries of the State. As native forest-trees and sub-forest growths illustrate the climatological peculiarities of a country, we append the following list for West Virginia,[1] viz.:—

[1] I. H. Diss Debar.

Evergreens.

Pinus strobus,	White pine.	Pinus nigra,	Black spruce.
" rigida,	Pitch "	Juniperus Virg.	Red cedar.
" variabilis,	Yellow "	Ilex opaca,	Holly.
" Canadensis,	Hemlock.	Kalmia latifolia,	Laurel.

Deciduous Trees.

Quercus alba,	White oak.	Ulmus Amer.	Elm.
" rubra,	Red "	Magnolia acuminata,	Cucumber.
" nigra,	Jack "	Lilia,	Linden.
" tinctoria,	Black "	Fraxinus Amer.	White ash.
" falcata,	Spanish oak.	Pyrus "	Mountain ash.
" castanea,	Chestnut "	Prunus Virg.	Wild cherry.
Liriodendron tulipifera,	Poplar.	Acer saccharinum,	Sugar tree.
Juglans nigra,	Black walnut.	" nigrum,	Black maple.
" cinerea,	White "	Liquidamber,	Gum.
Carya sulcata,	Hickory.	Nyssa multiflora,	Sour gum.
" alba,	Shellbark.	Betula,	Birch.
" tomentosa,	White "	Alnus serrulata,	Alder.
" porcina,	Pignut "	Carpinus Amer.	Water beech.
Castanea visca,	Chestnut.	Oystrya Virginica,	Iron-wood.
" pumela,	Chinquapin.	Diospyros Virginianæ,	Persimmon.
Esculus glabra,	Buckeye.	Populus pond.	Aspen.
Robina pseudaccacia,	Locust.	Salix aquat.	Water willow.
Gleditschia triacantis,	Honey locust.	Morus nigra?	Mulberry.
Fagus sylvatica,	Beech.	Cornus Florida,	Dogwood.
Plantanus occidentalis,	Sycamore.		

Sub-Forest Growths.

Sambucus,	Elder.	Rubus procumbens,	Raspberry.
Rhododendron.		Anona glabra,	Paw-paw.
Ribes,	Wild gooseberry.	Hammelis Virg.	Witch hazel.
Vitis cordifolia,	Wild grape.	Dirca palustris,	Leatherwood.
Laurus sassafras,	Sassafras.	Rhus glabrum,	Sumach.
Rubus villosus,	Blackberry.		

What effects have followed the removal of the forest-trees, etc., from the hill and bottom lands, and cultivation of the ground, in West Virginia?

As far as our observation extends, briefly these:—

1. A slight increase in the annual distribution of heat; winters generally less cold, and summers warmer.

2. No difference in the quantity or equal distribution of the rain-fall.

3. By the drainage, and drying up of ponds, and marshes in the low grounds, a removal of the chief source of malarial exhalation.

4. A more rapid descent from the hill-sides of the rain-fall,

attended with erosion of the latter, and banks of the rivers—impoverishing the soil of the former, by carrying off in solution its fertilizing ingredients.

INHABITANTS.

The total population of West Virginia by the census of 1870 was 442,014—of which 24,628, or about $\frac{1}{18}$th of the total number, are of foreign birth, and 17,980 colored.

The mountain counties are sparsely settled, whilst the thirteen counties bordering on the Ohio River contain 140,628, or about one-third of the whole; amongst this number will be found a large proportion of the foreign element. The native, comprising so large a majority, were derived from the pioneers, who came from old Virginia and Maryland, and were mostly of English and Scotch descent. They were an industrious and hardy race. Their employment of subduing the forest, cultivating the land, stock-raising, and hunting, with a plentiful supply of plain food, and a pure and bracing atmosphere, have left to their heirs a legacy of health and wealth, which has descended during the last hundred years to the present occupants, with no appearance of physical degeneration, and but little alteration in their habits or mode of living. Their character is well described by another:[1] "The genuine rural West Virginian is not much addicted to precipitous motion, rarely loses his temper or self-possession, and beyond the acquisition of the necessaries of life, limited by almost Spartan frugality, is disposed to leave the improvement of things around him to time and chance.

"This unprogressive disposition is the more striking, as his native intellect and sagacity are extraordinary, and susceptible of high development under proper direction, or the stimulus of personal ambition. Perhaps nowhere on the continent are there such treasures of natural power buried under the rust of indolence and prejudice, and at the same time such a display of urbanity and hospitality prompted by native tact and geniality." Of the foreign population, about one-half are German, one-third Irish, and the remainder from other parts of Europe. Our statistics will show a far greater mortality amongst this class, due to hereditary disease, change of climate, and living; beside, they are poorer, live harder, and work harder than the native.

[1] I. H. Diss Debar.

SUMMARY OF METEOROLOGICAL OBSERVATIONS OF WEST VIRGINIA.

Glancing at the geography of West Virginia, it will readily be seen that the State forms an elevated portion of the eastern border, or boundary of the great interior or Mississippi Valley, and subject to all the agencies by which it is influenced, and cannot practically be separated from it. Thus, in case of a sudden depression of temperature to the west, or northwest, we seldom escape a proportionate reduction. The same is true of movements, disturbances, and changes of every sort. Fluctuations of whatever character originating or prevailing east of the Allegheny Range, or along this part of the Atlantic coast, are seldom or never felt on our western slope.

For the abstract of temperature of all the stations in West Virginia, from the records of the Smithsonian Institution, Washington City, we present our cordial thanks to Prof. Joseph Henry, and also to Senator A. J. Boreman, of West Virginia, for his interest in our Report. We make a similar acknowledgment to Dr. Geo. O. Hildreth, of Marietta, Ohio, for his valuable statistics of a station on our western boundary line.

TABLE I.—*Observed Mean Temperature at Wheeling, W. Va.*

North latitude 40° 7′. Longitude 80° 42′. west. Altitude 640 feet.
Hours of observation, 7 A. M., 2 P. M., 9 P. M.

Years.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean Annual
1868	26° 66	34°.	42°.80	46° 66	60°.	72°.33	81°.	73°.32	57°.50	52°.09	43°.04	29°.99	51°.61
1869	42.4	35.53	34.32	48 44	58.58	69.44	73 16	75.33	66.	46.33	37.73	36.16	51.95
1870	35.16	31.70	36.77	48.16	65.45	72.	77.33	73 66	72.	55 88	43.86	29.66	53.05
1871	31 16	35.82	49 16	56.32	65 33	71 50	73.33	72 33	61.82	54.02	41.	30.19	53.48
Means	34.44	34 26	45.76	49.89	62.29	71.32	76.20	73 66	64.38	52.08	41.41	31.50	52.52

TABLE II.—*Highest Temperature in each Month.*

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1868	52°	46°	70°	73°	84°	86°	98°	90°	80°	72°	66°	53°
1869	56	65	68	70	84	87	95	94.5	86	74	63	55
1870	66	46	60	81	88	78.5	97	95	89	72	63	56
1871	60	63	72	84	89	92	90.5	93.5	84	78	65	59
Means	58.5	55	67.5	77	86.2	90.9	95	93.2	84.7	74	64.2	55.7

TABLE III.—*Lowest Temperature in each Month.*

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1868	5°	2°	1°	21°	42°	52°	65°	52°	44°	32°	30°	10°
1869	20	14	12	29	33	43	55	52	40	28	22	18
1870	6	7	12	35	45	55	62	57	47	35	28	2
1871	10	12	25	34	46	53	58	53	37	33	20	10
Means	10.2	8.7	12.5	29.7	41.5	55.7	60	53.5	42	32	25	5

TABLE IV.—*Mean Temperature of the Seasons and Year at Wheeling, West Virginia, from June, 1848, to January 1, 1872—23 years 7 months.*

Average for this period.

Spring	51°.	
Summer	71.54	
Autumn	52.72	
Winter	32.7	
Year	52.08	
Highest temperature	104.	(July, 1854).
Lowest "	—15.	(Jan. 1856).
Extreme range or variation	119.	

TABLE V.—*Hygrometrical State of the Atmosphere observed at Wheeling, from September 1, 1868, to August 1, 1871.*

Monthly means.

	Months.	Dew point.	Weight of vapor.	Humidity.
1868.	September	56°.11	5.582	.752
	October	43.96	3.795	.804
	November	37.70	3.071	.751
	December	36.	2.901	.884
1869.	January	38.35	2.906	.887
	February	44.03	3.456	.863
	March	36.78	3.652	.874
	April	43.96	3.842	.804
	May	56.11	4.522	.752
	June	60.32	6.402	.716
	July	58.38	5.949	.548
	August	57.16	5.739	.521
	September	33.21	5.060	.556
	October	41.17	3.801	.628
	November	34.79	2.647	.799
	December	36.25	2.977	.877

Months.		Dew point.	Weight of vapor.	Humidity.
1870.	January	38.6	2.137	.828
	February	33.48	2.667	.856
	March	37.78	3.311	.882
	April	49.4	3.946	.639
	May	54.8	5.349	.613
	June	55.97	5.430	.514
	July	60.90	6.450	.503
	August	58.30	5.992	.520
	September	55.83	5.371	.579
	October	51.29	4.245	.650
	November	38.52	3.141	.783
	December	38.50	2.727	.894
1871.	January	37.50	2.850	.850
	February	44.	3.520	.842
	March	37.20	3.540	.822
	April	37.40	2.889	.471
	May	52.75	4.938	.584
	June	54.38	5.314	.499
	July	56.89	5.765	.496

The above table shows the *average* dew-point, weight of vapor, and humidity. A number of observations were taken every day—the *time* being from sunrise until late at night—from these were deduced the mean for *each day*. Now, the amounts in the table represent the average of all the daily means, to form the final or *monthly mean*. The scale used was Mason's—1000 indicating saturation. Perhaps there are no other elements in meteorology which exercise a greater influence upon the predisposing and exciting causes of disease. We have often observed, that, whenever the scale of humidity was near .900, influenza, rheumatism, catarrh, etc., were almost sure to prevail.

TABLE VI.—*State of the Weather at Wheeling, West Virginia.*

The annual average for 27 years is—

of rainy and snowy days	119.81
" clear or fair "	170.16
" cloudy "	76.28

TABLE VII.—*Monthly Mean Temperature at Marietta, Ohio.*
By GEORGE O. HILDRETH, M.D.

N. latitude of Marietta 39° 24′ 40″. Longitude 4° 28′ west of Washington. Elevation 630 feet above the Gulf of Mexico. Variation of compass 0° 31′ east, with a westerly movement of two and a half minutes a year.

	1868.	1869.	1870.	1871.
January . . .	26°.89	35°.37	34°.31	33°.43
February . . .	29.33	34.79	31.95	35.89
March	44.68	36.31	36.43	47.96
April	48.25	49.55	52.02	55.18
May	58.81	59.47	63.51	61.70
June	67.74	68.05	69.17	70.56
July	77.96	72.16	74.83	71.01
August	70.72	73.06	72.29	73.61
September . . .	61.82	63.62	66.74	61.05
October . . .	50.63	45.49	54.10	54.53
November . . .	41.32	36.55	41.55	40.21
December . . .	29.24	34.36	30.91	29.80
Mean for the year . .	50.61	50.73	52.31	52.91

In Table VIII., when not otherwise stated, the means given correspond to the actual hours of observation; in a few cases, however, when these hours were not uniform, corrections were applied to refer the results to the regular observing hours, tables specially constructed for this purpose being employed. Most of the observations by regular Smithsonian observers, subsequent to 1859, were approximately referred to the mean of the day by adding twice the mean of the 9 P.M. observations to the sum of the means for 7 A.M. and 2 P.M., and dividing by 4; when this has been done it is indicated by the hours, 7. 2. 9. *bis.*

m. a. a.

TABLE VIII.—WEST VIRGINIA. *From the Meteorologi*

Name of station.	Lat.	Long.	H'ght feet.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	D
Ashland[1]	38° 34′	82° 10′	600	33°.25	45°.87	51°.00	56°.75	65° 81	73°.43	76°.91	75°.01	69°.97	56°.45	44°.72	39
Ashland	38 34	82 10	600	30 96	37.15	40.83	53 89	63.10	70.57	76.31	74.58	70.25	53.97	43.56	3
Ashland	38 30	82 15	600	35.14	37.43	42.54	53.89	61.05	71.49	74 72	72.36	68.79	52.18	42 98	3
Buffalo	38 36	81 56	500?	27.97	38.09	47.61	51.25	65.13	69.72	75.75	71.70	66.15	59.30	41.93	3
Buffalo	38 36	81 56	....	....	....	....	....	....	66.85	81.58	81.82	80.14	....	....	....	..
Burning Springs	38 56	31 ' 21	....	31.94	31.36	51.82	....	....	....	....	....	....	....	....	....	..
Capon Bridge[2]	39 16	78 29	....	....	38.96	38.87	43.39	59.94	....	....	....	....	....	....	....	.
Crack Whip	39 02	78 33	1720	23.31	31.48	34.63	45.41	55.87	68.47	70.54	66.27	60.00	50.38	40.27	2
Cross Creek[3]	40 16	80 33	....	27.58	31.59	41.77	48.85	65.47	66.49	71.38	70.01	61.15	46.73	36.63	3
Grafton	39 21	79 56	....	28.77	37.03	40.33	54.45	61.20	....	76.89	76.40	70.49	56.86	46.01	3
Holliday's Cove	40 22	80 37	....	....	....	....	....	....	....	....	....	76.98	63.76	54.36	....	.
Kanawha[4]	38 53	81 25	....	33.83	40.66	44.90	55 39	62.84	69.79	72.79	71 62	64.19	56.27	43.49	3
Kanawha	38 53	81 25	....	22.00	38.05	42.34	52.42	63.39	71.57	76.87	72.80	65.55	56.61	42.05	3
Lewisburg[5]	37 49	80 28	2000	33.18	39 48	47.18	53.37	66.76	72 62	78.47	74.24	68.62	57.08	44.43	3
Lewisburg	37 49	80 28	2000	29.03	37.21	44.07	48.00	62.37	66.48	71.51	68.60	61.42	51.63	39.73	3
Lewisburg	37 49	80 28	2000	30.64	34.12	40.79	51.59	62.98	69.35	74.05	71.95	64.03	52.01	41.68	3
New Creek Depot	39 25	79 00	....	....	....	38.99	40.87	....	....	....	....	74.20	....	....	....	..
N. R. Mills	39 20	78 29	....	33.05	34.07	53.05	57.03	....	....	....	....	....	....	....	....	..
Peach Grove Lodge	39 15	81 00	1100	20.19	26.08	31.76	53.86	61.24	71.60	76.88	70.69	....	....	....	....	..
Point Pleasant	38 51	82 09	480	32.32	37.79	48 79	44.64	73.50	72.13	....	....	....	....	38.36	3
Poplar Grove[6]	38 20	81 30	720	34.92	38.98	44.28	52.88	64.15	70.35	75.76	72.70	65.82	55.05	43.75	3
Romney	39 20	78 42	573	29.26	30.68	44.03	50.42	58.69	70.54	76.61	72.74	65.82	52.73	42.61	2
Salem	39 20	80 01	1100	....	36.93	47.72	....	....	....	74.61	....	69.61	54.39	....	....	..
Sisterville	39 34	80 56	540	....	....	....	....	57.13	69.16	73.08	....	65.45	50.51	38.78	3
Weston	39 00	80 22	....	28.87	33.63	35.95	....	....	69.85	....	....	....	....	42.98	4
White Day	39 30	79 55	....	33.27	36.94	39 94	....	63.81	72.67	81.65	77.71	67.73	54.35	45.19	3
Wheeling	40 05	80 43	600	31.43	32.90	42.37	51.40	....	....	....	....	....	....	42.15	2
Wirt Court House[7]	39 05	81 26	....	28.29	33 69	37.67	47.49	60.25	72.58	75.62	72.41	63.84	53.85	38.76	3

[1] Observations at 7 *m.* 2 *a.* 9 *a.* after January, 1853.
[2] Observations in March and May imperfect.
[3] Also known as "Trout Run Valley" and "Wardenville."
[4] The morning and evening observations were probably taken at ☉ *r.* and ☉ *s.*
[5] The observations at 7 *m.* 2 *a.* 9 *a.* after January, 1853, except for March, May, June, July, and October, 1853, at 7 *m.* 2 *a.*
[6] Also known as "Kanawah Salines."
[7] Also known as "Elizabethtown."

ervations of the Smithsonian Institution.

	Sam.	Aut.	Wint.	Year.	Series. Begins.	ends.	Extent. Yr.	Mos.	Observing hours.	Observer.	References and remarks.
15	75°.12	57°.05	38°.70	57°.18	1851—	1854	2	8	☉9. 3. 9. *r.m.a.a.*	Prof G. R. Rossiter S. Couch	MS. in S. Coll.
1	73.82	55.93	34.61	54.24	Jan. 1854	Jan. 1858	3	2	7. 2. 9. *m.a.a.*	Prof. G. R. Rossiter S. Couch	P. O. and S. I., Vol. I.
9	72.56	54.65	36.72	54.18	Feb. 1865	July 1870	4	6	7. 2. 9. *bis m.a a.*	C. L. Roffe	S. O.
5	72.39	55.79	33.90	54.19	1852		1	0	☉9. 3. 9. *r.m.a.a.*	Prof. G. R. Rossiter	MS. in S. Coll.
-	51.18	....	....	....	1858		0	4	7. 2. 9. *m.a.a.*	W. R. Boyers	P. O. and S. I., Vol. I.
-	....	....	....	....	1868		0	3	7. 2. 9. *bis m.a.a.*	R. H. Boliven	S. O.
10	....	....	....	....	1857		0	4	7. 2. 9. *m.a.a.*	Dr. J. J. T. Offutt	P. O. and S. I., Vol. I.
19	68.43	50.22	27.70	47.91	Jan. 1856	May 1861	2	6	7. 2. 9. *m.a.a.*	D. H. Ellis	P. O. and S. I., Vol. I., & S. O.
18	69.29	48.17	30.12	49.90	Nov. 1858	June 1860	1	8	7. 2. 9. *m.a a.*	B. D. Sanders	P. O. and S I., Vol. I., & S. O.
19	....	58.09	33.66	....	Jan. 1867	Feb. 1868	1	1	7. 2. 9. *bis m.a.a.*	Dr. W. H. Sharp	S. O.
-	....	....	....	....	1858		0	3	7. 2. 9. *m.a.a.*	R. B. Sanders	P. O. and S. I., Vol. I.
18	71.40	54.65	36.66	54.27	Jan. 1829	Jan. 1813	7	10	M. N. E.	D. Ruffner	MS. in S. Coll.
12	73.75	54.74	30.45	52 91	Jan. 1856	July 1859	2	8	7. 2. 9. *m.a a.*	D. L. Ruffner W. C. Reynolds	P. O. and S. I., Vol. I.
17	75.11	56.73	36.37	55.99	1851—	1854	3	9	9. 3. *m.a.*	Patton	MS. in S. Coll.
16	68.86	50.93	33.13	51.10	Apr. 1851	Mar. 1853	2	0	9 *m.*	Patton	MS. in S. Coll.
19	71.75	52.57	32.75	52.22	Jan. 1854	Mar. 1861	7	1	7. 2. 9. *m a.a.*	Dr. T. Patton Dr. W. J. Stalnaker	P. O. and S. I., Vol. I., & S. O.
-	....	....	....	....	1854		0	3	7. 2. 9. *m.a.a.*	M. McDonald	P. O. and S. I., Vol. I.
-	....	....	....	....	1868		0	4	2 *a.*	S. J. Stump	S. O.
93	73.06	....	....	....	1856		0	8	7. 2. 9. *m.a a.*	W. C. Quincy	P. O. and S. I., Vol. I.
64	....	....	36.65	....	Nov. 1858	June 1859	0	8	7. 2. 9. *m.a.a.*	W. R. Boyers	P. O. and S. I., Vol. I.
27	72.94	54.87	37.29	54.72	June 1856	Jan. 1861	4	4	7. 2. 9. *m.a a.*	J. E. Kendall	P. O. and S. I., Vol. I., & S. O.
86	73.30	53.79	29.65	51.95	May 1866	Sept. 1870	3	1	7. 2. 9 *bis m.a.a.*	W. H. McDowell	S. O.
...	....	....	....	....	July1857	Mar. 1858	0	5	7. 2. 9. *m.a.a.*	J. C. Wells	P. O. and S. I., Vol. I.
...	....	51.58	....	....	1857		0	7	7. 2. 9. *m.a.a.*	E. D. Johnson	P. O. and S. I., Vol. I.
...	....	....	34.21	....	Nov. 1865	Mar. 1870	0	6	7. 2. 9. *bis m a a.*	B. Owen	S. O.
...	77.34	55.76	36.14	....	May 1868	Mar. 1869	0	11	7. 2. 9. *m a a.*	Dr. W. A. Sharp	S. O.
...	....	....	31.01	....	Nov. 1859	Apr. 1860	0	6	7. 2. 9. *m a a.*	G. P. Lockwood	P. O. and S. I., Vol. I., & S. O.
47	73.54	52.16	32.33	51.62	May 1856	Dec. 1858	2	8	7. 2 9. *m.a a.*	Dr. J. W. Hoff	P. O. and S. I., Vol. I.

ISOTHERMAL CHART.

To illustrate the distribution of heat in West Virginia we offer the following Chart. In order to make the tracings as nearly correct as we are capable, we have gathered nearly all the meteorological observations and facts within the State, and the States adjacent to her boundaries; amounting in the aggregate to 207 years. Our deductions are based upon these records. In their reduction and discussion, we have endeavored to follow the standard formula of meteorology as closely as our facts would allow.

It will be found on close examination of data, based upon *actual survey*, that many sections of our country present climatological determinations peculiar to that district; such we find in West Virginia. In the decrease of temperature, for altitude, we have allowed 314 feet for 1° of temperature, and have used this figure in making our reductions to sea-level. The decrease of temperature for one degree of latitude, along the Ohio valley, is 1.9°, whilst along the mountain range it is 3.55°. In the chart we have traced the isothermal or annual, isotheral or summer, and isocheminal or winter lines. Mean quantities only have been used in the whole thermal illustration; these are drawn from all the single elements, and reduced to the final mean: thus, to compensate or correct the irregularities in the distribution of heat for successive years, and obtain as near as possible a constant or positive quantity, we have purposely omitted tracing the lines for spring and autumn; the heat of summer, and refrigeration of winter, being more nearly fixed quantities than the fluctuating seasons of spring and autumn. All the means used in tracing the *annual curve* were previously reduced to sea-level, but the *summer* and *winter* lines are made from the mean surface distribution of heat, to render them more practical in a sanitary or agricultural point of view.

TABLE IX.—*Atmospheric Precipitation.*

Monthly rain-fall (including melted snow) at Wheeling, W. Va. (in inches and one-hundredths).

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Aggregate.
1868	5.20	1.25	5.15	1.90	8.50	1.30	3.40	5.95	12.27	.49	5.78	4.38	55.57
1869	3.85	5.13	5.45	2.45	8.21	7 83	9 61	3.17	8.17	1.98	5.75	4.32	65.92
1870	6.76	5.	7.10	2 73	3.25	5.27	5 59	4.01	1.65	3.23	2.40	1.80	49.79
1871	3.85	2.75	1.45	3.84	6.56	3.90	5.70	6.64	0.05	3.15	3.35	2.85	44.09
Means	4.91	3.53	4.79	2.73	6.63	4 57	6.07	4.94	5.64	2.21	4.32	3.34	53 84

Average annual rain-fall for seventeen years . . . 37.09 (inches)
" " " spring for seventeen years . . 10.90 "
" " " summer " " . . 12.93 "
" " " autumn " " . . 9.57 "
" " " winter " " . . 9.36 "

TABLE X.—*Monthly Rain-fall, including Melted Snow, at Marietta, Ohio, in inches and thousandths.* By GEORGE O. HILDRETH, M.D.

Months.	1868.	1869.	1870.	1871.
January	2.936	4.620	5.285	2.440
February	1.370	3.660	2.930	2.711
March	5.173	3.945	4.860	1.460
April	4.120	3.405	3.910	2.010
May	4.630	2.350	1.835	2.712
June	3.380	4.725	5.130	2.788
July	6.450	4.965	6.370	5.360
August	4.780	2.706	2.695	3.328
September	10.310	5.135	0.930	1.540
October	1.856	1.282	2.182	1.468
November	2.476	3.155	1.890	1.433
December	2.555	2.915	1.965	1.770
Amount for the year . .	50.037	42.863	40.182	29.020

TABLE XI.—*Rain-fall from all the Stations in West Virginia, collected by the Smithsonian Institution, Washington, D.C.*

We are indebted to Prof. JOSEPH HENRY, Sec'y S. I., for the two following schedules.

Station.	Lat.	Long.	Alt.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
White Sulphur Springs	37° 45′	80° 20′	2000	2°.40	3°.22	3°.73	2°.93	3°.41	3°.16	4°.68	2°.79	1°·56	2°.16	3°.58	3°.92
Ashland, near Buffalo	38 34	82 10	600	1.88	2.60	3.01	4.73	3.53	3.89	4.90	3.08	3.23	1.77	3.24	3.54
Lewisburg	37 49	80 28	2000	2.88	2.76	2.56	2.66	2.17	2.52	3.37	3.32	3.58	2.02	4.00	3.91
Sheetz Mills	39 25	78 40	...	2.20	1.69	2.11	3.56	4.27	2.41	3.46	3.57	2.51	2.55	1.87	2.46
New Creek Depot	39 25	79 00	...	...	3.30	...	...	..	...	...	...	...	...	...	...
Kanawha	38 53	81 25	...	1.98	3.46	1.87	4.05	3.30	4.95	1.47	2.60	1.35	2.83	2.46	4.52
Poplar Grove[1]	38 20	81 26	720	4.75	2.93	3.64	5.69	3.59	5.67	4.49	6.02	2.87	4.51	4.65	7.03
Peach Grove Lodge	39 15	81 00	1100	3.48	2.25	1.70	2.74	5.52	2.36	2.22	3.02	1.71	...	...	...
Trout Run Valley[2]	39 30	78 30	1720	2.47	2.26	2.16	4.83	3.50	4.91	3.63	2.83	1.41	2.18	1.18	3.61
Salem	39 20	80 01	1100	1.50	1.62	1.52	...	...	...	3.72	4.30	1.60	3.60	1.56	7.86
Wirt Court	39 05	81 26	...	2.84	1.14	1.42	3·92	6.43	3.79	4.87	3.14	0.76	4.00	3.11	7.64
Cross Creek[3]	40 19	80 31	...	2.11	2.36	2.51	5.55	2.74	3.64	3.50	5.61	2.47	2.49	2.64	3.34
Point Pleasant	38 50	82 31	480	2.87	...	1.91	8.17	3.70	5.89	...	...	...	...	...	...
Wheeling	40 07	80 42	...	2.36	1.33	1.01	7.19	...	...	...	...	...	...	1.71	2.13

[1] Also known as Kanawha Salines.
[2] Also known as Crack Whip.
[3] Also Holliday's Cove; the cove about three miles north of the creek, observed September and October, 1858.

TABLE XI.—Continued.

Station.	Spring.	Sum'r.	Aut'mn.	Winter.	Year.	Time.		Observer.	Remarks.
White Sulphur Springs	10.07	10.63	7.30	9.54	37.54	5	6	Sept. 1847; Feb. 1853	Watts and Estill	MS. by Dr. Patten in Sm. C.
Ashland, near Buffalo	11.27	11.87	8.24	8.02	39.40	5	11	Jan. 1852; Dec. 1866	Prof. J. R. Rossiter and S. Couch, C. L. Roffe	MS. in Sm. Coll., P.O. and S. I. Vol. I., and S. O.
Lewisburg	7.39	9.21	9.60	9.55	35.75	6	0	Sept. 1852; Mar. 1861	Dr. T. Patton, J. W. Stalnaker	Report of Com. of Agr., H. Clark, MS.
Sheetz Mills	9.94	9.44	6.93	6.35	32.66	9	11	Jan. 1856; Dec. 1865	.....	Report of Com. of Agr., H. Clark.
New Creek Depot	...	...	...	...	...	0	1	Feb. 1854	M. McDonald	P. O. and S. I. Vol. I.
Kanawha	9.22	9.02	6.64	9.96	34.84	3	0	Jan. 1856; July, 1859	D. L. Ruffner, C. W. Reynolds	" " " "
Poplar Grove[1]	12.92	16.18	12.03	14.71	55.84	3	3	Apr. 1857; Feb. 1861	J. F. Kendall	P.O. & S. I. Vol. I. & S.O.
Peach Grove Lodge	9.96	7.60	...	...	...	0	9	Jan. Sept. 1856	W. C. Quincy	P.O. & S. I. Vol. I.
Trout Run Valley[2]	10.49	11.37	4.77	8.34	34.97	1	11	Jan. 1856; May, 1861	D. H. Ellis	P.O. & S. I. Vol. I. & S.O.
Salem	...	...	8.76	10.98	...	0	9	July, 1857; Mar. 1858	J. C. Wells	P.O. & S. I. Vol. I.
Wirt Court	11.77	11.80	7.87	11.62	43.06	1	10	Jan. 1857; Dec. 1858	Dr. J. W. Hoff	" " "
Cross Creek[3]	10.80	12.75	7.60	7.81	38.96	1	7	Sept. 1858; June, 1860	B. D. Sanders	P.O. & S. I. Vol. I. & S.O.
Point Pleasant	13.78	...	...	...	...	0	5	Jan. June, 1859	W. R. Boyers	P.O. & S. I. Vol. I.
Wheeling	...	...	...	5.82	...	0	6	Nov. 1859; Apr. 1860	G. P. Lockwood	P.O. & S. I. Vol. I. & S.O.

Mean rain-fall of the 14 West Virginia stations—
Spring, 10.69 in. Summer, 10.99 in. Autumn, 6.98 in. Winter, 9.34 in. Year, 39.22 in.

[1] Also known as Kanawha Salines.
[2] Also known as Crack Whip.
[3] Also Holliday's Cove; the cove about three miles north of the creek, observed September and October, 1858.

TABLE XII.—*Showing the Annual Rain-fall, including Melted Snow, at Marietta, Ohio, from* 1831 *to* 1871. From the Journal of Dr. S. P. HILDRETH, from 1831 to 1863. Since 1863, from the Journal of Dr. G. O. HILDRETH.

N. latitude of Marietta 0.39° 24′ 40″

Year.	Inches.	Year.	Inches.
1831	53.54	1852	46.50
1832	48.33	1853	37.04
1833	40.37	1854	38.80
1834	34.66	1855	45.75
1835	42.46	1856	31.90
1836	36.75	1857	40.64
1837	43.75	1858	61.84
1838	35.48	1859	48.55
1839	33.32	1860	53.35
1840	39.08	1861	46.415
1841	42.80	1862	42.713
1842	42.07	1863	37.066
1843	41.76	1864	40.936
1844	36.64	1865	48.841
1845	33.90	1866	47.269
1846	46.27	1867	46.706
1847	52.30	1868	50.036
1848	43.37	1869	42.863
1849	42.89	1870	40.182
1850	52.30	1871	29.020
1851	34.84		

Mean rain-fall for the seasons at Marietta:—

	In. 100ths.
Spring	10.10
Summer	13.22
Autumn	8.41
Winter	8.78
Year	40.52

Mean annual rain-fall, of all the observations in West Virginia, amounting in the aggregate to 103 years, 39.89.

The uniformity of the distribution of rain over the whole State needs no further demonstration.

WINDS.

Summary of the relative frequency of the winds at Wheeling, West Virginia, from January 1, 1856, to January 1, 1872 (16 years 7 months), recorded three times a day—15,173 observations.

TABLE XIII.

	Days.		Days.
South	438	Southwest . . .	5306
North	2093	Northeast . . .	15
West	1022	Northwest . . .	3571
East	61	Southeast . . .	292

The predominance of winds from a northerly and southerly quarter is apparent. The south and southwest winds are usually warm, and reach us so filled with moisture as to range from 600 to saturation (1000) of the hygrometric scale; this is commonly precipitated in the form of rain or snow, by the opposing currents of the north and northwest winds. The latter are dry and cold, their humidity ranging from 270 to 400. They "clear up" the atmosphere, imparting tone and force to the muscular and nervous systems.

Winds. (From Dr. G. O. HILDRETH'S Register.)

The prevailing winds, at Marietta, Ohio, are S.W. and N.W. In summer S.W. and S. winds prevail; in winter N.W. and N.

Rains usually follow S.W. winds.

The vane traverses in a circle: passing almost invariably from S.W. by W. to north, and from N. by east to south: pointing usually but a part of a day to the east. East winds are rare, and rain, with the wind from the east, occurs but a few times in a year.

With a north wind the barometer almost always rises.

EPIDEMIC DISEASES.

After more or less correspondence with physicians who have had long terms of practice in different sections of the State, beside interrogatories addressed to the members of the State Medical Society, at its annual meetings, on our prevalent diseases, they report generally a remarkable freedom from *epidemics* during the last four years, although some sections have been visited with severe and fatal forms of disease, more strictly *endemic* in their prevalence.

That numerous class of diseases called *malarial*, which in former times prevailed along the valleys of the Ohio and its branches, have long since disappeared; all other portions of the State being at an elevation, such as in the opinion of reliable observers, to preclude the generation or existence of this poison. However, in the early history of West Virginia, intermittent and remittent or bilious

fevers prevailed extensively over the sections named, usually from the early part of summer to the beginning of winter, not unfrequently extending throughout the year. Some locations were peculiarly liable to such visitations. To illustrate their type and treatment, we insert the following account of an endemic fever which occurred in Wood County, about fifty years ago, written by Dr. E. D. Safford, of Parkersburg. He says: "My father removed to this county in 1821. At that date and for three successive seasons (1821–2–3–4) a malignant bilious remittent fever prevailed, which approached as nearly yellow fever as the locality allowed. Usually it prevailed from May until November, and was confined to the water-courses and marshy grounds. Indeed, the Ohio River was filled in autumn with vegetation for more than one-fourth its width from either shore. Physicians were scarce, and, although those who were here performed almost herculean labor, yet many patients died for want of timely medical attention. Much contrariety of opinion existed in regard to treatment among the medical men of that period. My father regarded the disease as *sthenic* in character, and requiring active depletory and antiphlogistic treatment; while Drs. Riggs and Holliday (his contemporaries) took the opposite view, and, discarding the lancet and other active evacuants, placed their reliance on stimulants and support. Never did opposite views elicit warmer partisan feelings than were to be found on either side.

"Fresh from the school of the distinguished Rush, and confident of his correctness, my father, in the language of Rush, 'cleared the ship, fore and aft!' and if this seemed insufficient to enable her to outride the storm, he did not hesitate to throw overboard a part of the cargo. Indeed, so possessed did he become of the importance of bloodletting, that he employed quite a number of deputies, whom he instructed in this branch of surgery, and sent about to perform bloodletting, whenever, in his judgment, it was required. Ordinary attacks of fever were in this way often much benefited, and their duration shortened, when resorted to in the earliest stages. So intense was the general excitement in this disease, that cathartic medicine of the most active character (not neglecting the celebrated X. and X.) will often fail, until the patient was bled to approaching syncope, and many avowed that they owed their recovery to this means for relieving the obstinate constipation, which had distended their abdomens almost to suffocation. Much caution was necessary to guard the patients from all sorts of

stimulants, and a majority of them would recover sooner without them. Active evacuants had to be used freely in every case during its early stage, and often throughout its whole course. Intermittents prevailed in the autumn, but yielding to bark and wine after free evacuations.

"Pleurisy was of common occurrence, and required such active depletory measures as to satisfy the most sanguine practitioners craving for blood."

Pneumonia, dysentery, enteritis, and croup were the chief diseases of that early period. The first three, frequently complicating the fevers named, formed the chief source of danger. Bloodletting, antimony, calomel, and active purgation were in common use, to combat the high grade of inflammatory action attending them. Ptyalism was a very frequent consequence of the liberal use of mercurials. Such continued to be the approved treatment, with but little modification, until the year 1849. At this period a marked change in the symptomatology, course, and tendency of malarial fevers was generally remarked. Their onset was gradual, insidious, marked by lassitude, weakness, loss of appetite, palor, and chilliness, succeeded by little or no febrile excitement or headache. Periodical exacerbations and remissions occurred in some cases, which were promptly removed by the exhibition of bark or quinine; yet the patient, instead of convalescing as before, became more feeble and prostrate. The *asthenic type* was so strongly impressed, as to forbid the old treatment, and the lancet and mercurials were laid aside for stimulants and tonics, which have continued to this present time to form the basis of the treatment of all fevers. It should be here remarked, that in the years 1849–50–54, cholera prevailed along the Ohio and adjacent valleys, and, being coincident with the change to the typhoid type in fevers, the physicians of this section, almost without exception, regard this epidemic to have been the chief cause of such change.

Cholera never has invaded the mountain counties of this State, although a number of persons have died of it during their transit over the Baltimore and Ohio Railroad; having contracted the disease in other infected districts; yet we have never heard of a local case. At this time, and for many years past, typhoid or enteric fever is the only disease prevailing over the whole State.

In this elevated country you may search in vain for the reputed local causes of this disease. In salubrity, purity of atmosphere, drainage, wholesome diet, good water, ventilation, and other neces-

saries to vigorous health, it can scarcely be improved or excelled; yet in many places typhoid fever has prevailed in its most fatal forms.

In many instances whole families have been attacked.

Throughout the State the incursions of this fever have been more numerous on the high grounds than in the valleys.

The history of its prevalence in the city of Wheeling, where we have had ample opportunities of watching its progress ever since its advent amongst us, shows a large majority of cases to have happened in the higher and healthier portions of the city, and with the better class of our population; whilst, along the banks of Wheeling Creek (in the city limits), on low ground, with generally small and badly constructed houses, occupied by the poorer classes, the creek being the reservoir and recipient of the offal of numerous slaughter houses, debris of soap manufactories, oil refineries, gas works, back yard and street cleansings—the water in the creek in summer usually low, and in some places stagnant; making a combination of causes calculated to generate such a vitiated and impure air, as in the views of sanitarians would be capable of originating fevers of the most malignant grade;—the truth is, that this district has been almost exempt from typhoid fever, as is proven by the observation of every physician in this city; and we desire to record this fact for the benefit of future investigations into the causes of this fatal disease. From the rural districts, numerous well authenticated cases might be here adduced, proving the deportation of typhoid fever to previously unaffected districts, and from thence to others. The isolated position of many settlements in West Virginia, and infrequent communication with the rest of mankind, renders the evidence in these cases more clear and conclusive.

Typhoid or enteric fever has prevailed in all its forms—from extreme mildness to great severity—the attendants or complications, in the order of their frequency, have been classed as intestinal, pulmonary, and cerebral; the co-existence of two or more has often determined the gravity of the attack, or fate of the patient. We have examined the secretions and evacuations, chemically and microscopically, but failed to discover the *materies morbi*. Nor can we add anything new or valuable to the treatment advised by standard authors. During the last four years, the general practice with us has been modified, by using opiates and purgatives, or laxatives, with great caution. The use of the former,

where delirium is a prominent symptom, is apt in many cases to be followed by coma, or convulsive action, and generally fails to produce sleep or rest. Here, the judicious use of stimulants proves more beneficial and safer. The action of even the milder purgatives, after the first week (aside from the uncertainty of their effect), is liable to be followed by exhaustion, verging to collapse. It is, however, the practice of some to prescribe small doses (2 to 5 grs.) of blue pill (pil. hydrarg.) in all stages of typhoid fever. The present type does not require the enormous potations of brandy, of which we cited two cases in our first report in 1868.

The average duration of this disease is twenty-six and one-half days.

Phthisis Pulmonalis.—The chief subjects of this fatal disease are amongst our foreign population. The testimony of physicians in the mountain district is that they treat comparatively few cases.

In other sections of the State there is no doubt that it is increasing in proportion to the influx of population from the North and foreign countries. We have advised some six or seven of our own patients to spend the summer at one of the *high points* on the Baltimore and Ohio Railroad, and felt highly gratified with the results.

Among the operatives in our iron mills (Wheeling) is a class known as nailers, whose business is to grind (upon a dry grindstone) the cutters for each nail-machine. The face is necessarily held close to the work, and of course the dust continually inhaled by the operator. The effects produced upon the health of the person are, a dry hacking cough, usually paroxysmal, and more frequent at night. After an indefinite period the coughing spell is terminated by the expectoration of a small mass of black mucus.

A continuation of the harassing cough, with loss of sleep, soon affects the general health; indigestion and emaciation succeed. At this period the auscultatory sounds are mucous râles, with slight dulness on percussion over the whole chest.

After some time, the patient is seized with fever, usually at night, followed by exhausting sweats; under which, debility and emaciation are progressive. The cough increases in severity, and the expectoration becomes profuse and muco-purulent. The patient has the appearance of one advanced in phthisis. Up to this time, he has most likely continued at his work, but is now compelled to cease from extreme debility. The continuance and increase of cough, expectoration, fever, night-sweats, and often at this stage diarrhœa,

terminate the case. In the majority of cases the family record was entirely free from hereditary proclivity to phthisis or scrofula.

The medication is purely palliative. In some few cases the patients have been induced to give up this employment, but even then they recovered very slowly; we have not known a single patient whose health became as good as it was previous to his attack.

With Mr. Ed. Bocking we have examined the dust by his powerful microscope, and find it filled with steel and silex of a great variety of shapes; the steel mostly tufted and spicular, of sizes varying from 1-600th to 1-8000th part of an inch; the silex in sharp and angular pieces. It is presumed the inhalation of such materials irritates and inflames the bronchial lining down to the air vesicles.

We have repeatedly advised the use of a properly constructed blower to carry the dust away from the operator, and also a mask of wire-gauze over the nose and mouth. The disease is popularly known as nailer's consumption.

The whole subject of dust in factories and mills, as a cause of disease, deserves attention.

Pneumonia is next in frequency and fatality to typhoid fever. Winter and spring are the seasons of its greatest prevalence. Pleurisy not unfrequently precedes or accompanies it; and, when the lower lobe of the right lung is inflamed, there is often a consecutive hepatitis. Nourishing food and drinks, stimulants, and the use of veratrum viride, with a view of reducing the frequency of the pulse, and counter-irritation over the chest, constitute the most general and successful practice.

Dysentery, diarrhœa, and cholera morbus are the common diseases of our summer season, and are always increased in severity in proportion to the *difference* between the day and night temperatures.

Diphtheria, since its advent in 1859, has visited at intervals nearly every section of the State. Marion, Taylor, Preston, Harrison, and Monongahela Counties have suffered more than other districts. In children, under three years of age, croupal symptoms not unfrequently announce its invasion, and sometimes prove fatal before its full development. It is met in the daily routine of practice, and so constantly studied, we cannot hope to add anything to its pathology or treatment. Its sequelæ are numerous, and often as fatal as the original disease. The most frequent are, albuminuria, neuralgia, effusion in the joints, simulating acute rheumatism, paralysis, and an anæmic or cachectic condition, under which the

various forms of scrofula are rapidly developed in those having this proclivity. It is very uncertain as to the time when a patient once attacked may be said to have entirely recovered.

The following statement is the only one attainable, and may be considered an approximation to the truth, it is—

An Abstract of the Returns of the Register of Births, Marriages, and Deaths, for 1868–69, *West Virginia.*

1868.	Births	male 4377, female 3864	8241
	Marriages		2564
1869.	Births	male 4644, female 4268	8912
	Marriages		2662

TABLE XIV.—*Showing the Number of Deaths from Various Diseases.*

	1868.	1869.
Apoplexy	12	13
Bowels, inflammation of	66	33
Brain, diseases of	41	28
Cancer	14	17
Croup	56	38
Childbirth	17	18
Cholera morbus	38	32
" infantum	36	20
Diarrhœa	62	14
Diphtheria	47	28
Dropsy	70	59
Dysentery	34	64
Epilepsy	27	11
Erysipelas	30	12
Heart, disease of. 1868. male 44, female 29 — 1869. 15, 13	73	38
Measles	33	11
Old age	70	83
Paralysis	50	20
Phthisis pulmonalis 1868. male 127, female 125 — 1869. 117, 161	252	278
Pneumonia	49	58
Rheumatism	31	8
Scrofula	42	22
Smallpox	3	7
Typhoid fever	145	194
Violent or accidental	120	80
Hooping-cough	47	34
Miscellaneous	193	226
Unknown	329	448
Totals	1987	1891

TABLE XV.—*Showing Number of Deaths of each Sex at different Ages.*

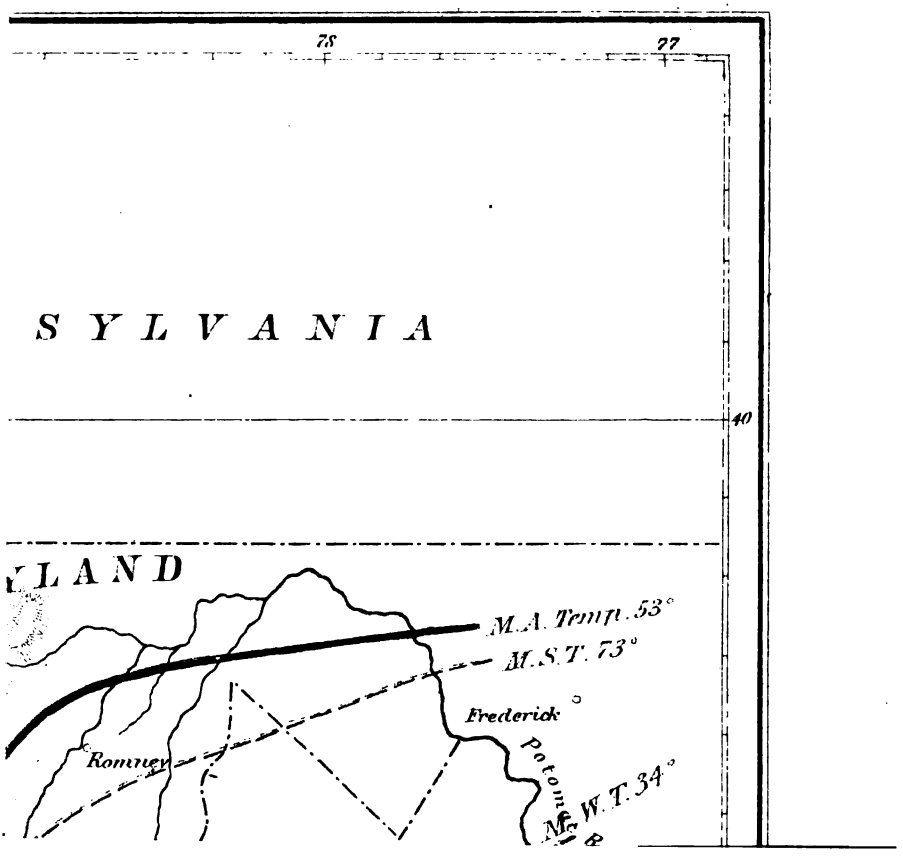
Ages.	1868.		1869.	
Under 1 year	male 194, female 166	360	male 267, female 188	455
1 to 5	male 139, female 141	270	male 153, female 140	293
5 to 10	male 97, female 93	190	male 45, female 40	85
10 to 20	male 66, female 83	149	male 76, female 70	146
20 to 30	male 55, female 59	114	male 78, female 112	190
30 to 40	male 44, female 65	109	male 42, female 98	140
40 to 50	male 67, female 73	140	male 37, female 51	88
50 to 60	male 64, female 73	137	male 42, female 41	83
60 to 70	male 87, female 73	160	male 67, female 53	120
70 to 80	male 71, female 58	129	male 60, female 46	106
80 to 90	male 34, female 27	61	male 34, female 22	56
90 to 100	male 8, female 5	13	male 11, female 8	19

TABLE XVI.—*Deaths in each month during the years* 1868–1869.

	1869.		1868.	
January	90		January	167
February	113		February	162
March	167		March	183
April	155		April	178
May	168		May	151
June	148		June	138
July	198		July	134
August	197		August	157
September	168		September	201
October	140		October	157
November	105		November	147
December	159		December	163
Date not given	77		Date not given	39
Total	1891		Total	1987

Ratio to number living (for 1868–69) 1 to 237.9.
The general ratio for the United States is 1 to 75.
The ratio by the seventh census for—

Louisiana is	1 to 42.85
Wisconsin is	1 to 105.82
Oregon is	1 to 232.82
Vermont is	1 to 100.29


78
77
S Y L V A N I A
40
L A N D
M.A. Temp. 53°
M.S.T. 73°
Frederick
Romney
Potomac R.
W.T. 34°

REPORT

ON THE

CLIMATOLOGY AND EPIDEMICS OF SOUTH CAROLINA.

BY

MANNING SIMONS, M.D.,

CHARLESTON, SOUTH CAROLINA

REPORT ON THE CLIMATOLOGY AND EPIDEMICS OF SOUTH CAROLINA.

SOUTH CAROLINA possesses a climate almost as varied as the physical features of the country which composes its different sections.

To render a clear description of the climate, and its relations to the health and diseases of the State, it is well that we should first make a brief survey of the character of its territory, and mark its geographical situation.

Wedged in between North Carolina on the north, northeast, and Georgia on the west, it is bounded on two sides of the triangle which constitutes its figure by water; the Atlantic Ocean on the east, southeast, and the Savannah River on the west. It lies between 30° 4′ 30″ and 35° 12′ north latitude, and 78° 25′ and 83° 40′ west longitude from Greenwich, and covers an area of about 30,000 square miles.

The physical features of the country vary with the proximity or distance from the coast of the different sections. Passing from the coast line north-northwest, the country is flat, and rises in an almost evenly gradual ascent until the mountains are reached, when a height of 3000 to 4000 feet is attained at their highest points.

"South Carolina is equally divided between the primitive and alluvial region." The alluvial extends about 100 miles from the sea-coast, and the primitive occupies the rest of the State. Within the first are found marine shell limestone and its attendants. The upper border of this formation passes in a northeasterly direction from the Savannah River, through the lower portions of Sumter, Darlington, and Marion, into North Carolina, forming almost a parallel with the sea-coast.

In the primitive formation, which extends from this line north-northwest, is found the granite and its attendants.

Each of these geological formations impresses its character upon the physical conformation of the country which it embraces; and at the same time influences the climate, and to a certain extent the diseases incident to the divisions severally.

In considering the physical features of the sections, we will begin with the sea islands, which are scattered along the coast from Winyaw Bay to the Savannah River. These islands are generally sandy, and for the most part healthy, being open to the sea, and under the influence of the fresh pure sea breeze and winds; removed moreover from the generating sources of malaria. To these succeeds the flat country, which extends for about 100 to 120 miles, when it terminates in the "Sand Hill" region. This Sand Hill region deserves more than the passing notice which we can give it. It is a belt of about 30 miles wide, extending in a direction from northwest to southwest, and passes through this State, into North Carolina and Georgia. "It corresponds with the point of transition of the tertiary to the primitive geological formation, and in some places presents an admixture of some of the elements characteristic of both."

The surface soil of this region is generally pure white sand, resembling that of the sea islands, and maintains this character to some depth.

This region appears to have once formed the shores of the ocean, which covered all the country below it. It is traversed by numerous small streams, or branches, as they are denominated, of clear, pure water, which wend their way to the rivers to which they pay their tribute. These streams are fed by natural springs, which flow from the sandy soil, of an icy coldness.

Taking the whole year round, there is no country more healthy.

The rivers in this section are bordered by a great extent of alluvial soil, extremely fertile, but at the same time unhealthy, and they furnish a stronghold and workshop for malaria.

Here, therefore, we have health and sterile soil allied, and fertility combined with unhealthiness.

Situated on the highest point of this Sand Hill range is Aiken, well known as a sanitary resort for invalids suffering with pulmonary troubles. This town, situated partly in Barnwell, partly in Edgefield Counties, is 120 miles from the coast, and has an elevation of 600 feet above the sea. The climate is characterized by a dry atmosphere; the mean temperature is 61.69°, and the mean temperature of the cold season 51.63°. We would refer to a

pamphlet, by Drs. A. Coffin and W. H. Geddings, for an exhaustive treatise on Aiken, as a sanitary resort.

From the Sand Hill region north-northwest, the character of the country is rolling; the sandy soil is exchanged for one of red clay, and the scenery becomes more varied. This country gradually passes into the mountainous region, and the section is reached into which the Allegheny range of mountains projects, the highest points of which rise from 3000 to 4000 feet above the ocean.

In reviewing this change of country, which embraces all the phases and transitions from sea-coast to mountains, one must be impressed with the natural inference that the climate must vary proportionally, and such indeed is the case, and to a certain extent the diseases also with the physical features.

"The upper part of South Carolina," says Mills, in his statistics, "we would repeat, is full of interesting scenery; her mountains present every variety of the wild, abrupt, sublime, beautiful, grand, and awful. Her rivers offer numerous cascades, placid surfaces, foaming torrents, and deep waters; the climate is the most delightful in the world; the Montpelier of the United States (as the amiable Abbè Corrè, ambassador of the King of Portugal, observed when he visited this State), the very seat of Hygeia herself."

Having arrived at the northern boundary of the State in our description thus far, we will retrace our steps, and in so doing refer to the rivers, and their variation in character in the different sections; for, as we will see, the health and diseases depend very much upon their nature.

The whole State is intersected by numerous rivers and streams, which uniting form combinations fewer in number but of greater size, which wind their serpentine course through the length and breadth of the country, to add their mite to the vast volume of the Atlantic.

The mountain region gives origin to a number of streams, which uniting themselves form the Broad and Saluda; these two coming together constitute the Congaree. The Savannah River, which rises in the mountains of North and South Carolina, traverses the whole length of the State from mountains to sea-coast, and forms its western boundary. The Catawba, arising in North Carolina, passes into South Carolina, where, with the numerous tributaries which it receives in its course, it forms the Wateree. This latter with the Congaree forms the Santee. The Great and Little Peedee

also, which rise in North Carolina, pour through the northeastern portion of the State, and empty into Winyaw Bay.

These rivers, especially those in the northwest, possess all the characteristics for about half their course of mountain streams. They rush their headlong course, and precipitate themselves over their rocky beds, forming cascades and numerous falls of great beauty. In this impetuous temper, they continue their course until the upper border of the tertiary geological formation, already mentioned, is reached, when they become calm and placid, as if preparing themselves at the end of their mad race for their termination in the ocean.

Augusta, Columbia, and Camden mark the points of transition, from the turbulence of mountain torrents to tranquillity, for the Savannah, Congaree, and Wateree respectively. The Savannah, Santee, and Peedee may therefore be regarded as the great channels by which the mountain waters find their way into the ocean.

From the points at which these rivers become tranquil, and smooth in their course, their borders change character with the streams. Here the well-known and historical swamps make their appearance and extend in some places to the distance of five, six, and even seven miles on either side. The borders of these rivers, therefore, present miles and miles of swamp land, which, in proportion to the character of the seasons, are alternately overflowed and dried, leaving a vast area of land impregnated with organic vegetable and animal matters exposed to the action of the sun. Here the naked cypress raises its branches stained with the clay marks of many a freshet, warning as it were against the subtle malaria which everywhere surrounds. Here, too, the dark beautiful green foliage of the water or live oak betokens the enriching power exercised upon the soil by that very process which accompanies the production of the poison.

The Sand Hill region gives origin to many streams, and branches which unite to form rivers. The Edisto, Salkahakhie, Combahee, Black River, etc., are all the result of these combinations of smaller streams which rise in this region. Most of these are derived from the pure springs already alluded to as abounding in the Sand Hill region. The waters of which they are composed are pure and clear near their sources, and maintain this character for some extent of their course, until their purity is marred by the accessions of surface water which they receive. A beautiful instance of this clear crystal character is given by the Eutaw Creek, which derives

its supply from the spring which is situated near, and bears the name of, one of the historical battle-fields of the Revolution of 1776. The waters of this creek are so clear and limpid, that minute objects can be distinctly seen on its bed, to the depth of 10 or 15 feet.

As the sea-coast is approached, there is another class of rivers of which the Cooper, Ashley, Wando, Waccamaw, Sampit, Stone, Ashepoo, Pocotaligo, Coosaw, Broad, etc., are types. They are peculiar in character, combining the nature of rivers with that of prolongations of the sea. They are generally wide and bordered with great expanse of marsh and black mud, with only an occasional bluff to change the monotony of the scene. They are generally affected by the rise and fall of the ocean tides, and in some of them even to their sources. Their waters are to some distance salt or brackish, but to what extent depends upon the seasons. At their heads they are supplied with fresh water derived from extensive swamps, and the drainage of the surface water of the neighboring country.

In the region of country bordering the coast and the rivers of the flat country, from the requirements of the cultivation of rice, there are many collections of fresh water called reserves. These are made as reservoirs to supply water for flowing the rice fields in the event of drought, and the consequent brackish state of the waters of the rivers just described. These collections of water, being still, offer a great superficial area to the process of evaporation, decomposition and decay. Their borders and surfaces, in the summer season, are covered with a green slimy mass, the result of the collection and accumulation of the putrescent and decayed animal and vegetable matters.

The rice fields border the rivers in the low country. They are on a level below the water line of the rivers, from overflow by which, they are protected by a system of banks or "dams." Trunks and floodgates connect these fields with the rivers, and furnish them their water supply. These fields are alternately flowed and drained during the spring and summer months, according to the exigencies of the rice crop, and therefore likewise furnish a fruitful source of malaria.

CLIMATE.—South Carolina lies "in the same parallel with Cyprus, Candia, Morocco, Barbary, Damascus, Tripoli, Palmyra, Babylon, and with other parts of Turkey in Asia, and with parts

of Persia, India, and China." "In comparing American climates with those of Europe, to bring them on a par with each other, a difference of 12 degrees should be allowed for peculiarities in the American Continent. The most remarkable of these is such a predominance of cold, as subjects an American, living in north latitude 35 to an equal degree of cold with an European residing in north latitude 47. If this opinion is correct, we should look for a resemblance of South Carolina, not in the countries which have been mentioned as lying in the same latitude, but in Aix, Rochelle, Montpelier, Lyons, Bordeaux, and other parts of France; in Milan, Turin, Padua, Genoa, Parma, Mantua, and other parts of Italy; in Buda, Beuda, Crimea, and other parts of Turkey in Europe; in Circassia, Astrachan, and other parts of Russian Tartary, and of Chinese Tartary, which lie between the 44th and 47th degrees of north latitude. It is certain that the points of resemblance are more numerous in the latter than the former case" (*Ramsay, Medical History of South Carolina*). "The climate of South Carolina is a medium between that of tropical countries and of cold temperate latitudes. It resembles the former in the degree and duration of its summer heat, and the latter in its variableness." It is favored with a serene, clear, blue sky, bright sunshine, sparkling stars, and soft moonlight, taking into consideration the influence of the ordinary inclemencies of the seasons. Its air is balmy, and the thermometric extremes moderate. The winters are short and gradually merge into the delightful weather of the southern spring. The summers are long, but the heat is by no means so great comparatively as is supposed by those who inhabit more northern and western regions. The character of the seasons varies, to some extent, with the proximity to, or distance from, the sea-coast.

Advancing to the north and northwest, the summers become shorter and the winters longer in proportion as the mountainous regions are reached. Though the summers are longer, and continue for 3 or 4 months, yet the thermometer rarely rises higher than in Baltimore, Philadelphia, and New York, and frequently the temperature of the latter is greater and exceeds that of this State.

The degrees of extreme heat are less in Charleston, and in the coast districts and islands, than in the interior and northwestern portions of the State. Two causes operate to bring about this result.

First. In situations near the sea and open to its influence, the sea breezes, which spring up generally about 10 A.M., temper the great heat and fan the heated inhabitants.

Secondly. These situations are subject to frequent rain showers, generally accompanied by thunder and lightning, which quickly give way to bright sunshine and clear sky, but greatly reduce the temperature.

In Charleston the temperature rarely exceeds 95° Fahr., in the shade, and does not frequently reach this point, but usually varies from 80° to 90°. In Aiken and other points of the interior, the thermometer has attained the height of 102°.

This season, as we have remarked, is shorter in the mountainous portions of the State. In this section, during the night and early morning, a blanket is frequently found necessary to comfort, though the heat of the day may exceed that of the coast districts.

The annual mean temperature for Charleston is usually about 64° 38′, which may be taken as illustrative of that of the other sections lying on the sea-coast. The mean annual temperature of Aiken is 61.69°, as given by Drs. Coffin and Geddings, which may also, in the absence of data, represent that of the middle or Sand Hill region.

The number of extremely hot days is not great, and these do not exceed more than four or five successively.

The winters are short, seldom extending over a greater period than three or three and a half months. They are generally mild, and for the most part there is a clear, transparent atmosphere, with a bright sun. Many days are warm, resembling spring and even a moderate summer's day. The difference, mentioned in relation to summer, between the upper and lower sections, still obtains as to the winter. As the heat of summer is moderated by proximity to the sea, so is the severity of winter softened and tempered by the influence of the gulf stream, which brings its warmth from hotter climes. The winters seldom present any very great degree of cold, and though the cold days occur in greater number proportionally, to those which are distressingly hot in the summer season, yet they seldom continue except for a short period, and only in succession of five or six at any one time.

Frost rarely occurs earlier than the 26th of October, and generally makes its first appearance early in the month of November; earlier, however, in the interior than on the seaboard. Snow is but rarely seen in the lower portions of the State, and then in quantity scarcely sufficient to cover the ground. In the upper districts, however, the mountains are, near the northwest boundary, frequently covered with snow, but even here it does not remain

upon the ground for any lengthy period. In these sections the winters are often severe and approach in character those of northern regions. They also begin earlier, and the cold weather continues longer than in the more southern portions of the State.

South Carolina is subject to frequent rain-falls, which occur most frequently in January, June, July, and August, and especially in the lower districts. The condition of the atmosphere, as to moisture, differs materially in the several sections of the State, and this variation depends much upon the physical character and location. In the lower counties and on the sea-coast, the dew point is generally high. This is accounted for by the following reasons: 1st. Proximity to the ocean. 2d. The numerous swamps, rivers, lowlands, rice fields, and the collection in low places in the flat country of the surface water, which, by reason of this very flatness, in the absence of proper drainage, is unable to find a free escape. 3d. The subsoil water is in many places on a level but a few inches below the surface.

On the islands, and on the coast, in proximity to the sea, digging to the depth of a few inches will cause an abundant spring of water, brackish however to the taste. In Charleston and its neighborhood, from wells sunk to the depth of from six to twelve feet, water can be obtained. This character changes, however, as the distance increases from the lower country, and in Aiken and other sections of the Sand Hill region the atmosphere becomes so dry and the dew point so low, that surgical instruments may be exposed for a lengthy period without rusting.

We here introduce the Meteorological Table for 1871, compiled from observations taken at Charleston, and regret that insufficient data have prevented us from giving similar reports from other sections of the State.

Meteorological Abstract of the Barometer, Thermometer, Dew Point, Winds, and Weather at Charleston, S. C., for the year ending December 31, 1871.

Taken under the direction of R. LEBBY, M.D., City Registrar.

MONTHS.	BAROMETER.			THERMOMETER ATTACHED.			Hottest day.	Coldest day.	THERMOMETER DETACHED.								REGISTER THERM.		DEW POINT.	Prevailing winds at sunrise.	Prevailing winds at 4 P.M.	WEATHER.			Quantity of rain.	Prevailing weather.
									Mean Temperature.			Max.			Min.											
1871.	Maximum.	Minimum.	Range.	Mean. 8 A. M.	Mean. 2 P. M.	Mean. 8 P. M.			8 A. M.	2 P. M.	8 P. M.	8 A. M.	2 P. M.	8 P. M.	8 A. M.	2 P. M.	8 P. M.	Mean night.	Mean day.	Mean.			Fair.	Cloudy.	Rain.	ins.	
January.....	30.500	30.020	.480	46.32	58.93	51.54	31	9	45.80	51.09	50.19	64	71	55	35	47	40	38.61	59.09	39.61	N. E.	N. E.	19	12	0	.85	fair
February....	30.514	29.866	.648	54.00	64.54	54.28	26	7	50.00	63.92	55.00	66	74	64	38	47	42	47.60	64.50	46.57	N. W.	N. W.,S.W.	17	8	3	3.74	"
March.....	30.400	29.812	.588	62.25	71.35	63.25	15	1	62.32	70.19	62.29	73	80	69	48	59	54	53.00	71.87	51.22	N. E.	S. W.	23	7	1	4.37	"
April.....	30.500	29.614	.886	66.63	78.23	66.93	7	2	66.96	76.33	65.96	76	90	73	56	63	56	57.16	78.46	53.21	S. W.	S. W.	17	11	2	4.30	"
May.....	30.410	29.860	.550	73.32	79.58	72.45	22	6	73.29	79.19	71.16	80	89	79	56	65	57	60.35	80.35	55.86	S. E, S.W.	S. W.	21	8	2	3.74	"
June.....	30.300	29.900	.400	79.80	86.36	78.90	20	13	80.76	85.86	78.30	86	96	88	76	75	71	71.20	87.33	77 82	W.	S. W.	21	7	2	3.19	"
July.....	30.260	30.025	.235	83.87	88.06	80.96	10	25	81.45	90.16	80.77	89	102	88	71	80	72	71.51	91.54	66.11	W.	S. W.	26	5	0	.81	"
August.....	30.320	29.770	.550	75.12	85.06	79.12	4	19	82.96	85.72	78.87	83	94	84	73	75	72	71.51	86.06	70.51	N. E.	N. E.	15	13	3	16.18	"
September...	30.466	29.940	.526	74.10	78.63	72.53	17	30	71.16	78.53	72.03	83	88	80	57	72	60	63.17	77.27	62.03	N. E.	N. E.	11	10	9	5.29	"
October	30.464	29.875	.589	68.06	77.64	69.70	16	12	68.80	77.50	68.64	77	86	75	60	70	62	62.16	78.32	60.19	N. E.	N. E.	18	9	4	2.86	"
November...	30.468	29.710	.758	58.46	68.13	57.80	30	1	58 16	67.82	54.00	74	84	74	40	45	40	51.16	75.20	49.98	N. E.	N. W.	20	8	2	3.64	"
December....	30.508	29.876	.632	47.77	59.58	50.79	24	21	45.87	58.87	49.19	61	77	66	30	37	33	41.32	59.67	40.57	N.	S. W.	21	8	2	2.00	"

DISEASES.—The diseases of South Carolina are none of them peculiar to its territory, nor do they differ from those, which exist in other portions of the United States, except perhaps the yellow fever. For healthfulness, it ranks high as compared with the other States, and its yearly mortality will bear a favorable comparison with that of other sections. In illustration of this point, we will introduce the mortuary reports of the City Registrar of the city of Charleston for the years 1866, 1867, 1868, 1869, 1870, and 1871. In order that these statistics may be understood, it is proper to state, that the proportion of whites and blacks to the total population is about equal. During the year ending December 31, 1866, there died in the city of Charleston:—

Whites	607
Blacks and colored	1164
Total	1771

Proportional mortality to population 1 in 19.774.
The entire population being estimated at 35,000.

In 1867.

Whites	462
Blacks and colored	879
Total	1341

Proportionate mortality to population 1 in 26.099.
Entire population estimated at 35,000.

In 1868.

Whites	390
Blacks and colored	818
Total	1208

Proportionate mortality to population 1 in 28.973.
Entire population estimated at 35,000.

In 1869.

Whites	453
Blacks and colored	918
Total	1371

Proportionate mortality to population 1 in 32.77.
Total population by census 1869, 44,923.

In 1870.

Whites	539
Blacks and colored	1075
Total	1614

Proportion of deaths to population 1 in 30.33.
Estimated population by census 1870, 48,956.

In 1871.

Whites	714
Blacks and colored	956
Total	1670

Proportion to population 1 in 28.11.

In reviewing these tables, one must be impressed with the justice of the preceding remarks. It will be observed that the death-rate of the blacks and colored is universally greater than that of the whites, and the number of deaths of the former is at a moderate estimate double that of the latter. 1871, it must be remembered, was a yellow fever year, and yet we find this disproportion in the death-rate unchanged, though the difference is not so marked as in the preceding years. We must observe that although the yellow fever existed in the summer of 1871, the mortality was not great enough to make any material difference in the proportional mortality.

On comparison of the years 1871 and 1866, we find that in the former the proportional mortality was 1 in 28.11, whilst in 1866 it was 1 in 19.774. This difference may be accounted for, in the different results of the census on which the calculation was made; but this is not sufficient to vitiate the value of the statistics, as the census by which the calculation of 1866 was made, was in all probability not a less accurate estimate of the population than that of 1871.

Principal among the diseases of South Carolina may be placed the malarial, in its various grades and types. These, however, as a rule, are mild; their character as to frequency and severity varying with different seasons. In some years the poison appears to be generated in greater quantity, and to be more concentrated. The congestive forms are, however, not frequently met with, and as compared with the types met with in the West are less malignant. From the brief sketch already made, it can well be understood why malaria claims the first consideration in a description of the dis-

eases of this State. In considering their distribution, we may make, for convenience, a rough division of territory into three sections.

I. The first of these may be made to comprise all that section lying intermediate between the sea-coast and Sand Hill region. Here exists all that combination of circumstances calculated to generate the malarial miasm, granting that the present most received opinion of its production, from decayed and decaying vegetable matter, under the influence of heat and moisture, be the correct one. In this region exist the wide extents of swamp land, either entirely or partially overflowed by the streams which they border, spreading for miles over the country. The land is flat, with deficient artificial drainage, and not sufficient natural slope or elevation to furnish a proper free escape for the accumulation of water, which becomes stagnant, and remains under the influence of the intense rays of the summer sun.

In this region are located for the most part the rice fields, which, as we have before said, are abundantly flowed with and drained of water, according to the requirements of the crop. With these are their reserves of stagnant water. Besides these sources of malaria, there arise from the flat nature of the country abundant collections of surface water, the result of the frequent and heavy rain-falls to which this section is subject. In addition, may be mentioned the subsoil water, which is but little below the surface. This section may therefore be denominated the malarious district. Even in this section, however, the malarial influence does not envelop all localities. There are many broad extents of barren pine land, which enjoy immunity from the poison, that may exist in all its virulence at the distance of only a few miles, which separate them from the sickly plantations.

These regions furnish summer resorts to many of the planters, who are able to go each day to the scene of their labors and return at nightfall to the "Pine Land," where they as a rule have immunity from malarial infection. The sea islands also form an exception to this general diffusion of malaria, at least those which are open freely to the sea; of these Sullivan's Island is an instance. It is a summer resort for the people of Charleston and the vicinity, and is (with the exception of a small area) free from this influence. This island even escapes, in most instances, the epidemic influence of yellow fever when this disease exists in all its virulence in the city of Charleston, distant only about five miles.

Charleston, situated on a tongue of land at the confluence of the

Cooper and Ashley Rivers, also possesses a remarkable freedom from malarial disease. Though bordered by marsh land, and in proximity to St. Andrew's and Christ Church parishes, it is rare for a case of malarial poisoning to have its origin in the city proper. The upper wards, composed of what was formerly known as the Neck, do not enjoy the entire immunity possessed by the lower portion, but even here malaria but rarely originates. Years ago, before the Neck and city proper were united under one municipal government, the former section was subject to a fever denominated "neck fever," a species of malarial disease. With the growth and increased population which the section has received, this disease has greatly diminished, and is now merely known as a tradition of the past.

II. The second division of the State may be made to include that portion of rolling clay land country which extends to the lower border of the mountain region. In this division, although malaria exists, it is by no means so diffused as in the preceding division, and is confined to certain regions, generally in the neighborhood of the water-courses. In the Sand Hill region proper, malaria does not exist; in fact it enjoys almost entire immunity, except in the swamps which border the rivers at or near its upper and lower boundaries.

III. Lastly, the third division may comprise the mountain region, where malaria arrives at its minimum.

The malarial diseases prevail in the latter part of spring and during summer and autumn, until the first heavy frost, when they disappear, to return with the next season. The cases which occur in winter are the result of infection during the preceding season, and are generally intermittents, frequently of the quartan type. These diseases, manifestations of malarial poisoning, are generally tractable, and mostly under the control of quinine properly administered. Typhoid fever exists, but rarely becomes epidemic, and though met with in all sections, is more frequent in the upper districts.

South Carolina is subject to its share of the generally diffused diseases of the chest; pneumonia, pleurisy, catarrhs, and throat affections are present, particularly in the winter season; but these are by no means so frequent as in the more northern region. This is particularly the case with bronchial catarrhs and throat affections.

It is well to note in this place the difference as to frequency of occurrence and fatality in relation to diseases of the chest, especially pneumonia, in the whites and negroes. The latter suffer far

more severely, and appear to have a peculiar vulnerability in respect to these diseases. All of our reports from the interior of the State concur in this statement. By way of illustration of this point, we will introduce the following figures from the city Registrar's reports of the city of Charleston, of the deaths from pneumonia, during the years 1866, 1867, 1868, 1869, 1870, and 1871.

During the year ending on December 31st, 1866, there died of pneumonia:—

Whites	18
Blacks and colored	75
Total	93
1867.	
Whites	15
Blacks and colored	49
Total	64
1868.	
Whites	10
Blacks and colored	31
Total	41
1869.	
Whites	18
Blacks and colored	53
Total	71
1870.	
Whites	16
Blacks and colored	54
Total	70
1871.	
Whites	10
Blacks and colored	31
Total	41

It will be observed that the death-rate from all forms of pneumonia, among the blacks and colored, is always greater than among the whites, and that this proportion remains unchanged during the six years, the statistics of which we have given, in so far as they bear on this point.

South Carolina is no exception to the rule of general distribution of consumption throughout the world, and especially in temperate latitudes; but it must be added that it is far less common than in

localities further north. We would note here, also, the very frequent occurrence proportionally of this disease among the negro portion of the population. This point has been observed in this city before, and has furnished a topic of discussion, but our attention has been particularly attracted to it of late by our own observations.

We will introduce the statistics of the six years already alluded to, drawn from the same source, to illustrate and verify this statement.

There died of consumption, in the city of Charleston, during the year:—

1866.	
Whites	53
Blacks and colored	75
Total	128
1867.	
Whites	44
Blacks and colored	85
Total	129
1868.	
Whites	47
Blacks and colored	77
Total	124
1869.	
Whites	38
Blacks and colored	94
Total	132
1870.	
Whites	47
Blacks and colored	134
Total	181
1871.	
Whites	53
Blacks and colored	135
Total	188

It appears to us, that, besides the genial character of our climate, there is another reason which operates to confer on us, to a certain extent, immunity from the very common occurrence of pulmonary consumption as it exists in the more northern States. It is this: the severity of our winters is rarely so great as to require the use

of registers, for heating the houses, either by steam or otherwise. Notwithstanding the frequent very cold spells, which occur during our winters, it is very rare to find the houses or even the public buildings heated in this manner. With no double doors and windows, the inhabitants content themselves with such warmth as may be obtained either with stoves, grates, or open fireplaces. In the cities and towns, grates, and in the country districts, the old-fashioned open fireplaces, with the cheerful oak fire, are in use. By this means, the great transition from the dry heated atmosphere of the house to the very intense cold without is not experienced, and the catarrhs and bronchial affections dependent thereon are not so frequently met with.

Measles, scarlatina, hooping-cough, and catarrhal fever have existed at various times during the past year; and in this, up to the present time, but neither in such amount nor so diffused as to entitle them to the term epidemic, except perhaps mumps, since March, 1872. Such cases of scarlatina as have occurred were of the simple variety.

Smallpox, which has laid such a heavy hand upon Philadelphia, New York, and other of our sister cities at the north, has not as yet visited us in anything like an epidemic form. Only a few cases have made their appearance in the entire city of Charleston, and we have received no reports of its existence in the interior portions of the State. These cases have been traced to a passenger by one of the steamers from New York, who developed the disease after his arrival in the city of Charleston, and with him, the individuals who were the subject of the succeeding cases had direct communication. Vaccination and revaccination have been generally employed; the people being willing and anxious to have the operation done, though there is no law to compel them to do so; and they have manifested none of the late fashionable prejudices against it.

We have now to speak of the epidemic of yellow fever which visited the city of Charleston, and to a small extent the town of Beaufort, during the summer of 1871.

Charleston has at various times, and at varying intervals, suffered from the ghastly ravages of yellow fever, frequently and justly denominated pestilence. There is some question as to its first appearance among us, but it is generally assigned to the year 1699 or 1700, when from its fatality it was called the plague. Having once got its foothold, and found a genial atmosphere, it returned

in epidemic form in 1703. In 1728 it again returned, and received the name yellow fever. In 1732 it began to rage as early as May, and continued until September and October. In 1739 it was nearly as violent as in 1732, and was observed to fall most severely on Europeans. In 1745 and 1748, it was less violent. Again, in 1753 and 1755 there were a few cases. Forty-four years elapsed from 1748 before Charleston was again visited with this disease as an epidemic. In 1792 a new era occurred in the history of yellow fever. It raged in that year, in 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1802, 1804, and 1807. In 1803 and 1805 there were a few cases, but in both years the victims did not exceed 59. In 1793 and 1808 the disease is not mentioned, and in 1806 only a few cases occurred. From 1807 to 1817 there are no records of its existence as an epidemic, although there were sporadic cases. In 1817 it prevailed with great malignity. In 1819, in 1824, when it reached Sullivan's Island, in 1827, 1828, 1830, 1838, and 1839, the disease was epidemic. From the last date, a period of nine years, there was no epidemic, and the disease did not appear except, in a few cases, in the suburbs of Charleston in 1841. It is a remarkable fact, deserving of note, that in the last-mentioned year, although cases were carried into the city, the disease did not propagate or spread.

In 1850, break-bone fever existed as a wide-spread epidemic. In the words of Dr. Wragg, in an address to the Medical Society of South Carolina, "Perhaps the annals of medicine will not furnish another instance of such general sickness, and such small mortality" . . . . "seven-tenths or eight-tenths of the people were sick." The small amount of electricity in the atmosphere during this summer was particularly noted.

In 1852, yellow fever was again present, but, though wide spread, many of the cases were very mild, and doubts were entertained of the genuine character of these. In 1853 a few sporadic cases are noted, which did not spread. In 1854 the disease again prevailed very extensively, but the epidemic, like that of 1852, was characterized by a large number of mild cases, as to the genuine character of which the same doubts were entertained. Dr. Dickson, writing of this epidemic in the *Charleston Medical Journal*, said: "The number of persons attacked by fever in the city was wholly beyond precedent, except during the prevalence of influenza, or the invasion of dengue." Dr. Cain spoke of it as "not an epidemic but a pandemic." In 1854 the disease also appeared in Georgetown and Beaufort. 1857 was marked by an appearance of yellow fever at

Mount Pleasant, two and a half miles from Charleston, where it was said never before to have been present, and to a very small extent in the city. In 1858 a severe epidemic visited Charleston, and prevailed on Sullivan's Island; and in 1864, during the war, the disease prevailed to some extent in Charleston. We have been unable, unfortunately, to lay our hands on the only written account of this latter epidemic, but, so far as we can arrive at the facts, it began in the northwest portion of the city, and prevailed in the upper wards, above Calhoun Street, which formerly marked the division between the city proper and the Neck. In 1866 there was a wide-spread epidemic of fever, concerning the nature of which there was much dispute; it resembled the dengue, however, in this much, that the mortality was exceedingly small. It was called dengue, break-bone, relapsing, and sweating fever, after that of the middle ages. It defied classification in any of the groups of writers on fever. It was a wide-spread epidemic, and all classes of the population were attacked, irrespective of age, nativity, or acclimation. We were informed by the late Dr. Wm. C. Holbeck, an accomplished and skilful physician, who had much experience in yellow fever, that he saw, during this epidemic, several cases of well-marked yellow fever with black vomit. It is a matter of regret that no history of this epidemic has been written.

As to the mortality of these epidemics of yellow fever, which have prevailed as above detailed, we have but vague accounts up to the year 1799. In 1732, when the population was about 10,000, it is recorded that at the severest period of the epidemic there died daily from eight to twelve persons.

In 1799 . .	died 299	In 1804 . .	died 148
" 1800 . .	" 184	" 1807 . .	" 162
" 1802 . .	" 96		

The population at these periods was about 20,000.

In 1817 . .	died 270	In 1830 . .	died 31
" 1819 . .	" 176	" 1834 . .	" 49
" 1824 . .	" 231	" 1835 . .	" 24
" 1827 . .	" 62	" 1838 . .	" 353
" 1828 . .	" 26		

The population in the last year was estimated at 30,000.

In 1839 . .	died 133	In 1856 . .	died 206
" 1849 . .	" 123	" 1858 . .	" 680
" 1852 . .	" 280	" 1864 . .	"
" 1854 . .	" 624	" 1871 . .	" 213

This brings us to the year 1871 in the history of yellow fever in its connection with this city. In reviewing this record, we are struck with the irregularity in the visitations of this disease in its epidemic form, and search in vain for anything like system or method. This character of irregularity is as much to be marked in the frequency of its occurrence as in the severity of the disorder, and on a careful study, we are also struck by the increasing mildness of the epidemics since 1824, if we except the years 1838 (when the great fire occurred), 1854, and 1858. We will also remark the frequent occurrence (almost in alternation) of epidemics of break-bone or dengue, with those of yellow fever since 1849; and again the large proportion of mild cases to the severe, in the various epidemics from 1839 to the present time, as compared with the epidemics of preceding years, is also a matter of note.

It will be observed that the disease is mentioned as sporadic in many of the years which made the intervals of its epidemic attack.

In 1871 this much dreaded malady again laid its hand upon the city of Charleston. It weighed down the energy which was manifested in her repair, improvements, and elevation from her disasters; clenched its remorseless fingers around her sources of prosperity; closed up her avenues of commerce; and brought desolation and mourning to the homes of her people. It marked a new era in quarantine, and, by land quarantine as well as that by sea, ostracized and debarred her from communication even with her sister cities.

The health of Charleston had been unusually good during the spring and early summer of 1871; indeed, to so great an extent, that it was the subject of general remark among the people, who congratulated themselves upon this favorable disposition of Providence. But they were unhappily soon awakened from their state of security, and deprived of this source of self-congratulation, by the appearance in their very midst, without warning from without, of their old and dreaded enemy. Difficult as it was to relinquish the hope of a continuing healthful state, the profession was obliged to admit the genuine character of the disease which presented itself to their observation.

On the 19th of July the first case was seen. As this case has been disputed, we give the notes furnished us by Dr. Jno. L. Ancrum, who was in attendance. "Lizzie Clark, Irish, aged 31, No. 10 Chalmers Street, twenty years in Charleston, but had travelled about a great deal, and had never had yellow fever, was first seen

on the evening of 19th July. High fever, pain in head and back, tongue furred. 20th. Had a restless night, fever unabated, eyes suffused, urine pale and scanty. 21st. Delirious last night, vomits all ingesta, passed little or no urine, eyes much injected and slightly tinged with yellow. 22d. Partial collapse, wild delirium, black vomit in large quantity. 23d. Collapse complete, still vomiting, but not so frequently, suppression of urine complete. 24th. Comatose, icteric hue intense. 25th. Died early this morning.

"These notes are given partially from memory, the essential parts from note-book." The certificate was given for "Icterus."

On the 29th of July the first undisputed case developed itself in the person of a German, Wagner by name, who was employed and resided at Mr. Claussen's steam bakery in Market St. between Anson and East Bay Sts., a distance of two squares to the north and two to the east of Chalmers St. This man was attacked on the 29th of July, and admitted into the City Hospital at 9 A. M. on the 3d August. At 9 P. M. vomited copiously black vomit, and died on the same evening, his body tinged yellow.

August 6th. Jas. Maloney, an Irishman, aged 24, a clerk who had resided in Charleston twenty months, was attacked in the evening, at No 37 Market St., and died on the 11th August.

August 10th. A female child aged 4, native, residing in Market St. opposite Mr. Claussen's bakery, was attacked, but was convalescent on the 25th.

August 11th. A German who was employed and resided at Mr. Claussen's bakery was attacked; he was removed to the corner of George and Meeting Sts., where he died on the 16th, having vomited black vomit.

On the same day, August 11th, Mary Morumy, an Irish girl aged 21, who had resided in Charleston two years and six months, was attacked at her residence in Beaufain St. opposite Archdale four squares west and one square north of Claussen's bakery, and died on the 15th with black vomit.

August 16. Mrs. W., Irish, two years in Charleston, residing at the same place as Morumy, was attacked; she did not vomit black vomit, and recovered.

August 17. A Canadian residing at No. 8 Beaufain St. was attacked and died on 24th with black vomit.

On same day two cases were reported on East Bay near Market St.

August 18th. One case reported in Market St., one case at No. 10 Anson Street. August 19th, one case on East Bay near Market St.

20th. One case Market near Anson, one case in Market St. between King and Archdale Sts.

21st. One case at the corner of Franklin and Queen Sts., one in the southwest portion of the city, one case in Beaufain St., one at Claussen's, one in Market near Anson St., one No. 11 Anson St.

22d. One case in King St. above Queen.

23d. One case in Stolls Alley in southeast portion of the city. This patient had worked at the new Custom House at the foot of Market St. on Cooper River.

24th. Two cases in Coming St. opposite George St. three squares north and two squares west of Beaufain St., one case corner Market and Meeting Sts., one case corner of Hasel and Meeting Sts., one case in Chalmers St.

These cases were reported at an extra meeting of the Medical Society of South Carolina held for the purpose, and were transcribed by our own hands as secretary of the society.

Without further relating cases, we will trace the disease from its point of departure, and note its course as it developed itself over the city.

It will be observed that the disease extended itself first westwardly, and from its first step distributed itself in all directions. It travelled up Meeting St., where we hear of it at the corner of Hasel St.; down Meeting, where we hear of it in Chalmers St.; westwardly, at the corner of Franklin and Queen; northwest, in Coming opposite George. On the 24th of August deaths were reported in Lambal St. in the extreme southwest portion of the city, on the 26th, and in Philadelphia St. in the southeast on the same date. From this period, the disease burst upon the entire lower portion of the city from Calhoun St. to its southern extremity. On the 31st of August, the first death was reported above Calhoun St. in Vanderhorst, and again September 3d a death was reported in Spring St., thus showing that in three days the disease had made a jump of five squares.

It will be seen from this statement that the disease pursued an erratic course from its point of starting, following no direct line, nor did it step from house to house, summoning their occupants to submit to its power, but leaped about in different directions, and made its appearance in various localities of the city at the same time, as if uncertain where to reap the rich harvest which lay open to it. It must be admitted, however, that, in the beginning of its career, Market Street was its favorite point of attack, and this pro-

clivity it maintained during its prevalence in the lower wards. Claussen's, the place of its birth, furnished five victims during the epidemic; indeed so marked was its violence at this point that we note the fact here, in order that in our inquiry into the cause of its origin we may bear it in mind. The epidemic tendency continued from seventy-five to ninety days.

The number of deaths was 213. The nativities of the victims were as follows:—

United States.

Alabama	2	Ohio	1
Connecticut	2	Pennsylvania	2
Georgia	4	Virginia	3
Indiana	1	Louisiana	1
Massachusetts	1	Maine	2
New Jersey	2	South Carolina	40
New York	6	Charleston	41
North Carolina	2	District of Columbia	1

Foreigners.

Canada	2	Scotland	1
England	5	Bohemia	1
Spain	1	Bavaria	1
Italy	2	Poland	6
France	1	Germany	62
Ireland	17	Sweden	1
Denmark	1		

It will be observed that the number of deaths of natives of Charleston is large in proportion to those of foreigners and natives of South Carolina and other States of the United States. This strikes us particularly, as in former epidemics it was generally the case that native adults who had resided always in the city of Charleston were as a rule exempt from attacks of yellow fever.

This subject, therefore, claims our attention, and is worthy of an investigation. During a large portion of the war, the city to the extent of more than half was uninhabitable, and uninhabited by the people by reason of its being under fire of shells. A large part of the people were, therefore, obliged to seek safety for their families in the interior of the State. During this time and the period before their return to their homes, many children were born and were consequently unacclimated, and hence as fit subjects for yellow fever as foreigners. Again, a very large portion of the male population were in the armies, which took them out of their native atmosphere. If the point is conceded, that acclimation once

obtained can be lost by removal for the period of four years, this class also afforded fit food for the epidemic.

Another point to be investigated is, the large proportion of the German population, to whom the disease came in a fatal form, as compared with that of other nationalities. The solution of this may be found in the fact, that in the last five years our increase of population from foreign sources has been by an accession of Germans almost exclusively. To this, and not to any peculiar susceptibility on the part of the German to the poison of yellow fever, is to be assigned this disproportion of mortality.

In the earlier epidemics of yellow fever in Charleston, the negro population enjoyed a peculiar immunity.

In the year 1802 there was not a single death among the blacks, and only one mulatto died of the disease. In subsequent years they were not so fortunate. Dr. H. W. DeSaussure, in his "Report of the Meteorological and Sanitary condition of Charleston for the years 1857–58," read before the Medical Society of South Carolina, remarks: "A marked feature of the epidemic of this year [1858] was its proclivity to attack the colored and black population. This tendency was somewhat developed in 1854, but acquired a great increase during the present season, and the deaths among this class of population were more than double those of 1854. The mortality was very small, however, in proportion to the number attacked." This tendency was continued in the epidemic in 1871. There died 23 black and colored; and the same remark may be made, in relation to the proportionate mortality to the number attacked, as in 1858.

The fevers of the epidemic of 1871 presented themselves under forms so different as, in the opinion of many, to warrant a distinction between them. They may be divided into two classes, according to their course and groupings of symptoms.

I. Yellow fever proper, and II. an epidemic form of fever, by some denominated break-bone.

I. The first, as the most severe, fatal, and typical, deserves the first mention. Yellow fever has been so graphically painted by the able pens of LaRoche and others, that we will content ourselves with a simple narrative of those symptoms and groupings of symptoms most frequently manifested in the epidemic, which forms the subject of our present consideration.

The invasion was usually sudden, though occasionally prodromic symptoms gave warning of its approach; these prodromata, when

present, differing in no material point from those of the continued fevers. A chill generally announced the onset, or frequently, in the absence of this, its place was supplied by sensations of chilliness, immediately followed by pain in the head, back, and limbs, which was often exceedingly severe. Nausea with vomiting of the contents of the stomach, and afterwards of biliary matter, frequently accompanied this stage. The chill or chilly sensation rarely endured any length of time, and was followed by fever. The skin, usually intensely hot to the touch, was in most cases dry, but not invariably so, as sweating was sometimes present, though it did not abate the feeling of heat. The pulse was frequent, ranging, however, from 100 to 120 or more in the minute; its character varying in different cases according to the habit of the patient under observation. The pain in the head, back, and limbs increased in this stage, and formed one of the most distressing symptoms. The headache was intense, usually frontal, though its location was not invariably in this point, but extended to the orbits and globes of the eyes. The face was usually flushed, though not always, this symptom varying in different cases. The eyes were red and injected, having the appearance so well described as like that produced by smoke. A watery character was not invariable, and the dry glassy eye could be occasionally seen.

The circulation, at first active in the capillaries, as the disease advanced became sluggish, giving a dusky appearance; the blood returning slowly after pressure from the vessels. With the advance of this stage, these symptoms became intensified, and the pains already noted became very severe and tormenting, especially that in the back and head, and, as a result, jactitation and restlessness were added, accompanied by moans. Delirium and restlessness characterized the nights, but the former symptom was not present in all cases. Thirst was frequently complained of as an annoying accompaniment of this open febrile stage. Inward heat and pain on pressure, in many cases, over the epigastric region, with irritability of the stomach, were present. The duration of this stage varied from twelve to seventy-two hours or longer, and generally it passed off suddenly. In fatal cases the termination seldom occurred at this time.

At the end of the period stated, the distressing symptoms became ameliorated: pain ceased or was much mitigated, the skin cooled to the touch, the pulse diminished in frequency. But this calm was generally only a lull preceding the storm which was to break upon

the patient, in many instances to overwhelm him. The stomach became more irritable than in the preceding stage, everything was rejected and medicine had to be omitted. The matters vomited consisted of mucous or watery fluid, at first clear, but further on, when settled, depositing grayish or black specks with great aptitude likened to snuff or grounds of coffee. This vomit was but the harbinger of the approach of the ominous black vomit, with reason dreaded. The skin lost the flush which it had in the previous stage, and assumed a deeper or livid hue, and collapse was marked, constituting the second stage.

The brain and nervous system were often engaged in this stage, manifested by delirium or sluggishness of intellect. Many cases terminated here with the life of the patient; others passed into the third stage, marked by many of the symptoms of the second, but with others superadded, indicative of the disorganizing blood change which was progressing. The vomited matter became blacker, greater in quantity, and easily ejected.

The capillary circulation diminished in activity in the earlier portion of the disease, rapidly became more sluggish, and a very fatal symptom was manifested, suppression of urine. The eyes and skin assumed the yellow hue which has given the name to the disease, in some cases becoming dark. Occasionally, hemorrhages were added to the already fearful scene, which was closed, in most cases that reached this point, by death.

We are informed that a few cases of the algid form were seen during the epidemic. In some cases, the subjects of which had been addicted to excessive drinking, the disease ran its course very rapidly, the several stages being run into each other, the symptoms bearing on their face their fatal character in the inception.

Albumen early appeared in the urine, in most of the severe, well marked cases having been observed as early as the second day. In fact it was almost a constant symptom. Black vomit occurred in a large number of cases, but it must be observed here, that in this epidemic a number of cases, especially in children, in which this symptom was manifested, finally recovered. Suppression of urine was seen in a very large proportion of the fatal cases, and was regarded as a most ominous sign, betokening the fatal termination of the cases in which it occurred.

We annex thermometric records of several cases of this form of fever.

Thos. Fox (Irish), 7 months in Charleston; malignant case. Admitted into City Hospital, August 21.

Date of		Temperature.			Pulse.			Respiration.		
Disease.	Month.	9 A. M.	5 P. M.	10 P. M.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.
1	August 21									
2	" 22	105 noon	106	106.5						
3	" 23	105.5 9 A.M.	105	104						
4	" 24	104	103.5	100.5						
5	" 25	102	100.5	101.5						
6	" 26	died								

Black vomit on fifth day of disease.

Albumen in urine on day of admission.

Segin Sabbath (Poland), 7 months in Charleston; gravior. City Hospital.

Date of		Temperature.			Pulse.			Respiration.		
Disease.	Month.	9 A. M.	5 P. M.	10 P. M.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.
1										
2		105.5 1 P.M.	105.5	105						
3		105 9 A.M.	105	105.5						
4		102	...	102.5						
5		102	102.5	102						
6		102.5	102	101						
7		100	100	100						

Black vomit on fifth day of disease; albumen in urine on third day of disease. Died, on fourteenth day of sickness, of "septicæmia."

Wm. R. D., native, unacclimated, 22 years; gravior; recovered.

Date of		Temperature.			Pulse.			Respiration.		
Disease.	Month.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.
1	Sept. 23	...	...	104.2	...	...	110	...	...	22
2	" 24	100	100.8	101	104	92	92	24	20	20
3	" 25	102.8	103.2	R.[2]	88	86	...	22		
4	" 26	101.2	100.2	102	72	60	64			
5	" 27	100	99.5	100	64	68	64			
6	" 28	99.5	S.[1]	98.7	60	...	52			
7	" 29	98.5	99.2	99	52	56	52			
8	" 30	98.4	98.4	99	60	56	60			
9	Oct. 1	...	...	...	56	56				

[1] Sweating; no observation was taken.

[2] Refrigeration having reduced temperature, no observation was taken.

Jos B., native, unacclimated, 25 years old; mitior; recovered.

Date of		Temperature.			Pulse.			Respiration.		
Disease.	Month.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.
1	Sept. 25	...	...	102.2	...	...	96			
2	" 26	100.8	...	100.4	96	...	88	20	...	20
3	" 27	98.4	98.2	98.4	72	72	68			
4	" 28	98.4	...	98.4	72	...	72			
5	" 29	98.9	...	99.5	72	...	72			
6	" 30	98	...	76	...					
7	Oct. 1	98	...	...	68					

Our thermometric records are too few to permit us to hazard an assertion, but we are prepared to admit that the febrile movement of yellow fever is characterized by remissions in an eighth hour cycle. In making this statement, we desire to be distinctly understood, as not intending to confound remittent fever due to malaria, with specific yellow fever.

In the second or stage of calm, though the skin may return to the normal or go below, in its temperature, this remains high, in most cases, falling somewhat in certain instances at the time of the occurrence of black vomit. This will be observed particularly in chart number 1.

There were noted as sequelæ of the yellow fever, in one case, parotiditis, and in a number of cases a form of entero-colitis, characterized by dysenteric discharges, which continued a variable period after the disappearance of the symptoms of yellow fever, and rendered the convalescence tedious. We have also been informed of the occurrence in two cases of gangrene of the scrotum and penis.

This type of fever attacked principally foreigners and those residents of the city who had but recently made it their home, having come from colder and more northern regions. Those natives, who were the subjects of its attack, were generally children under eleven years; the youngest whose death is reported being three months. But seven deaths were recorded of adult natives; these were aged 15 years 6 months, 18, 19, 22, 25, 31, 34.

The case reported as having died at thirty-one years was Lizzie Clark, whose case was the first of the epidemic. She had resided twenty years in the city, but had travelled about, during this period, a great deal from place to place, returning at intervals to

the city of Charleston. The death at thirty-four was of a gentleman who spent nearly every summer on the sea islands, and could not be considered as acclimated. That at twenty-five was of a gentleman who, though recorded as a native, had lived but five years in Charleston. The death at fifteen years and six months was of a young lady who had resided but five years in the city, and that at twenty-two was of a young man who had resided twenty years in the city.

It will be observed, that by far the most part of the natives who died were either children under eleven years, adolescents, unacclimated adults, or those who having been acclimated lost this protection by absence from their native place.

II. Ephemeral Fever, or, as denominated by some, Febricula, or "Break Bone." This fever consisted of a febrile paroxysm lasting from twelve to forty-eight hours. It was ushered in occasionally by a chill, generally simply by the shivering or alternate flushings and chilly sensations common to the beginning of fevers, followed by febrile reaction, pain in the head and limbs, occasionally severe. The skin was hot, pulse frequent, generally full; the tongue was furred, sometimes almost natural in appearance. Nausea and vomiting were occasionally present but not constantly; the eyes were clear and devoid in most instances of the red watery character which was displayed in the form described above. At the end of the period varying from twelve to forty-eight hours, generally twenty-four, the fever abated, and the patient entered upon convalescence, without any symptoms which would indicate the second stage of yellow fever.

We must remark, that, in some cases, in the advanced period of the epidemic, it was impossible to arrive at any judgment as to the course which would be assumed by the case under observation. In cases even where the paroxysm was severe, the patient would, at the termination of the fever, enter immediately upon convalescence at the end of eighteen or twenty-four hours. Again, instances occurred in which cases at first mild passed into the most severe and malignant form of well-marked, typical yellow fever.

This fever differed in the large majority of cases in no essential particular from ordinary febricula, and was in many instances reported as such to the Medical Society, during the existence of the epidemic, while the typical yellow fever was present in all its majesty. It respected no bounds, and attacked native as well as foreigner, but was mild in character, no fatal case having been re-

ported as resulting from it, where the forms were distinguished in the report. The two forms went hand in hand, visited together, and the two diseases could be seen claiming their subjects in the same house and even in the same bed.

Previous attacks of well-marked yellow fever in former epidemics, as well as acclimation, afforded but feeble barriers to the attack of the ephemeral fever. Natives who in former epidemics had well-marked yellow fever, were just as well subjects for it as the native adolescent or the adopted citizen. As one of a number of instances of this peculiarity may be mentioned the case of a German who had suffered from yellow fever in Havana, had been in Charleston through other epidemics with impunity, but did not escape an attack of this ephemeral fever. It frequently preceded the yellow fever, leaving the subject of its attack still to suffer from the inroad of its more powerful and dangerous companion. Instances of this kind were too numerous to be considered simply as coincidences. By way of illustration we will introduce a few instances.

Jno. Williams, born on Long Island, New York, a sailor, was admitted into the City Hospital, October 15, with "ephemeral fever," and was discharged cured on October 23. Readmitted on October 30, with yellow fever well marked, and died with black vomit November 3. This case is taken from the hospital case-book.

Mr. E. H. C., born in Walhalla, South Carolina, resided in Charleston seven years, employed in the office of Mr. Claussen's Bakery, Market Street, was attacked with a mild form of fever on September 1, recovered, and was well enough to attend to his business. At the end of fourteen days, he was attacked with yellow fever and died.

We have reports of two other cases in which, a month after attacks of ephemeral fever, the subjects had severe typical yellow fever.

The following are taken from the books of the Medical Society of South Carolina.

"One case was that of a mulatto woman, aged 30 years, a native, who had been away for the summers during twelve or thirteen years. In September she had an attack of ephemeral fever, which lasted thirty-six hours; she recovered, and at the end of two weeks she had a second attack of fever, which ran the course and pre-

sented the symptoms of yellow fever, from which she also recovered."

"A German, who had been in this country eighteen months, was attacked with the 'prevailing fever' comparatively severely; gums were touched with mercury. The patient remained well for a month, and is now suffering from an identical attack."

These instances might be cited to a much greater length, but we deem these sufficient to establish the point. We append a chart showing the range of the thermometer in a mild case.

Meta A. A., native, 5 years 1 month; mild ephemeral; recovered.

Date of		Temperature.			Pulse.			Respiration.		
Disease.	Month.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.	Morn.	Noon.	Eve.
1	Aug. 31	...		102.8						
2	Sept. 1	102.3		102.1						
3	" 2	97.5		97.2						
4	" 3	97.5								
5	" 4	98.5								
6	" 5	98.5								

Between these classes of well-marked typical yellow fever and the ephemeral fever, there were cases which occupied a middle ground, exhibiting the pointed tongue with white coat and red edges and tip, and in which the stomach asserted in a more pronounced manner its part in the disease than in the mild form.

Proportional Mortality.—It is a difficult matter to arrive at an estimate of the proportion of fatal cases of fever to the number of cases which were seen during the epidemic. This difficulty arises from several sources.

Hospital statistics, which are generally employed as the means of information, avail us nothing on this occasion. Most of the cases treated in hospital are seldom admitted on the first day of the disease, and oftener later than the second. Under such circumstances, the death-rate must necessarily be very high, as the good results of treatment could not be expected when the most important time for its employment had passed before the patients came under observation. Mild cases were seldom under observation, for the reason that the majority terminated within the first twenty-four hours. Calculations based upon such statistics would, for obvious reasons, give but an unfair estimate of the general proportion of mortality.

We have, therefore, been obliged to resort to the results of private practice for the materials necessary; but even here we are met by another source of error, which arises from the different views as to classification entertained by different practitioners. Many made no distinction between the fevers, but classed them all under the head of the "Prevailing Fever;" under these circumstances the results of their work must show greater success than that of those who were more strict in their classification.

Of 1177 cases of all types and phases of fever met with during the epidemic, selected only for the accuracy with which they were recorded, there were 43 deaths or .036 per cent. This statement demonstrates clearly the mild character of the epidemic, the mortality of which will compare favorably with that of measles, and offers a record much better than that of smallpox or scarlatina.

Of 585 cases of fever, noted as "ephemeral or break-bone," there was not a single death. In 300 cases of fever, 75 were noted as yellow fever; of these 75, 15 died, or 20 per cent. In 484 cases, 124 were noted as yellow fever; of these 124 cases, 7 died, or 5½ per cent. Of 20 cases noted as yellow fever, 8 died, or 40 per cent. In 43 cases of fever, noted as yellow fever, under the liberal classification, 1 died, or a little over 2 per cent.

It will be observed, therefore, that the mortality of the yellow fever varied, according to the views (as to classification) of the individual observer, from 2 per cent. to 40 per cent. In noting the mild character of the epidemic, we do not wish to convey the idea that the cases which were well marked as yellow fever were peculiarly mild in character, or that the disease presented itself in a form different from that which we have before known.

Many of the cases were exceedingly malignant, especially in those instances where its subjects as strangers afforded a field for its unrestricted action. The number of light cases of fever gave to the epidemic those features which entitle it to the term. The number of people who were sick with fever during the season was very great, although the mortality, as already shown, as estimated in relation to the number of cases considered without distinction of type, was very small. The field of operation for yellow fever was much diminished by the departure from the city of many of those who were or considered themselves subject to its attack. It is said that people to the number of 5000 left the city within two weeks.

Treatment.—As to the treatment, we have but little to say. No heroic plans were adopted or countenanced. In the early period of the disease a mercurial cathartic generally began the treatment, followed by a saline. On the occurrence of irritability of stomach, all efforts were directed to its relief or amelioration. For this purpose, such agents were used as corresponded to the views, or were in accordance with the special inclination of the individual practitioner. For our part we relied upon milk, ice, and lime-water, and were satisfied with the results obtained. Stimulants were used in the latter stages as they appeared to be necessary. In the febrile paroxysm, cold sponging, the wet sheets, and other methods of refrigeration were employed, with marked diminution in the temperature, and to the great comfort and relief of the patient. The sulpho-carbolates were used, but the results obtained were not such as to demonstrate any peculiarly beneficial effect. Blair's treatment, by twenty grains of calomel and twenty-four of quinine, was tried, but did not claim many strong adherents; indeed, the employment of quinine was not much in favor. We are informed from many sources (which coincided with our own experience) that the effect upon the nervous system, especially the brain, was in a number of instances very unfavorable. We tried this method in one instance, but were so much dissatisfied with the effect that it was not repeated in any others. No estimate could be put upon the power to abort the attack claimed by Dr. Blair for his method, for many more cases of fever terminated at the end of eighteen or twenty-four hours, without such treatment as he recommended, than did with it.

During the prevalence of the epidemic, there were reported, at the meetings of the medical society, cases of mumps and chicken-pox. Ephemeral fever was reported as present in July.

Absurd as it may appear at the present period, when diseases are studied with the light of experience gained by time, and clinical observations are so carefully made, the question must be raised, "What constitutes yellow fever?" With the impressions of an epidemic of this disease and the results of its fatal effect fresh upon our minds, and its ravages but a few months at an end, the profession of Charleston are divided in opinion upon this point.

A well-marked typical case, with its stages, formidable array of symptoms, its fearful black vomit, passive hemorrhages, and yellow skin, presents a picture which, once seen, makes its indelible impression upon the mind. It is not this class of cases, unmis-

takable and impressive, which causes difficulty in diagnosis; its reality is too fearfully marked, and its features too fatally characteristic, to admit of hesitation. The so-called phases and variations of type, however, are far from plain, and it is the recognition of these, as identical with the typical cases, that has brought about the complexity which now invests the subject. This admission had been productive not only of disappointment and loss of faith in the teachings of former experience, but in many instances the sacrifice of life, by reason of confidence based upon the immunity supposed to have been conferred by attacks of those modified forms of yellow fever which have been classed in the same category as the disease to which the term was originally applied.

No one can review the mass of literature of yellow fever, and not be impressed with the necessity of studying each epidemic of fever, by itself and in its relations to the peculiarities of the locality in which it occurs. With this view, we have been induced to make a distinction between the two predominant forms of fever met with in the epidemic which forms the subject of our consideration. In doing this, we are not ignorant of the terms of compassion in which Rush speaks of those physicians who, in the epidemic that visited Philadelphia in 1793, were guilty of recognizing in the "tertian" and "quartan" types (during the intervals of the attacks of which the patients were able "to go abroad") "as many diseases as the yellow fever had symptoms." In so doing, we have not lost sight of the number of phases and variations of type attributed to yellow fever, by those who have described epidemics and written on the subject; and the extensive latitude allowed to this disease beyond all others for its manifestations.

The results of our own observations have induced us to distinguish the ephemeral form of fever from the typical yellow fever; although we are aware that this opinion is not without opponents even in our own community. Veitch, in his letter to the commissioners for transports and sick and wounded seamen, published in London in 1818, uses the following expression: "The confounding the remittent fever with the ardent fever of strangers in a tropical climate is not the result of the difference between them passing unobserved, but it often arises from an injurious tendency to generalize."

By this system of generalization, during the presence of yellow

fever, especially in those places where it does not occur epidemically, except at intervals, all forms of fever are assigned to its influence, irrespective of symptoms or the grouping of them. This is demonstrated by a statement made by Mr. Blair in his accounts of the epidemics of Georgetown which occurred during 1837 and subsequent years. He notes three forms of yellow fever, Gravior, Mitior, and Simplex, but remarks, "the simplex form was not distinctly recognized till 1841." It is natural to suppose, that, if this simplex or "ephemeral form" of fever had presented the characteristics of yellow fever, it would not for nearly five years have escaped the vigilance of so acute an observer as Dr. Blair.

Under the influence of the dogma, that the presence of one disease of power drives away all others before it, we have departed step by step, and little by little, from the original type of the yellow fever, until now, under this pressure, it is not even necessary that fever should be present, or that the individual should be confined to the house, who is supposed to be laboring under the disease that was considered to be as malignant and fatal as the plague, with which it has been confounded.

Rush included in his 3d class, "those in whom the miasmata acted so feebly as not to confine them to their beds or houses." Gillkrest, who, in the *Cyclopedia of Practical Medicine*, gives an admirable sketch of the history of yellow fever, says: "From what has been said, it must be evident that great difficulties stand in the way of affixing pathognomonic symptoms to yellow fever; it has even been observed that those very slight attacks which occur not unfrequently during epidemics, and in which we have not a single well-marked symptom of fever, seem to give the admitted degree of immunity during subsequent epidemics."

Should we accept this classification, yellow fever, justly considered as most fatal and malignant in its true type, fades off into health so imperceptibly that it is impossible to draw the line of demarcation where the one ceases and the other begins.

Yellow fever, which in the early history of Charleston is described as so fatal on its first appearance in 1699 or 1700 as to have given it the appellation of "the plague," in this and subsequent years sweeping off the population by families, and claiming as its share three-fourths to one-sixth of all those whom it selected for its attack, in 1871 prevailed with a mortality of .036 per cent. Under this view, one by one the landmarks have been removed from the history of yellow fever. One attack, which

was formerly supposed to give immunity from another with rare exceptions, now provides no barrier to a repetition—nay, to attacks with each appearance of the disease. In illustration of this point, we will introduce the following: Dr. Thomas, in his treatise on yellow fever, as observed at New Orleans; Paris, 1848, Review, *Charleston Medical Journal*, states, that three varieties of yellow fever were admitted in a report to the medical society, an attack of either of which was sufficient to give immunity from second attacks. In the first variety, the symptoms of the first stage alone existed, and the case then terminated in convalescence. In the second, besides the symptoms of the first stage, more or less of the symptoms of the second and third stages were present, the greater proportion of these recovering. In the third variety, the symptoms of all three stages existed in great severity, or else the disease ran its course so rapidly that the stages were indistinguishable. He did not admit the first class as genuine cases of yellow fever, since they did not give immunity from subsequent attack; cases having come under his personal observation, of individuals contracting yellow fever years after undergoing attacks of the first variety, although continual residents of New Orleans. His definition of yellow fever is, a disease which, besides symptoms of the first period, presents some of those characteristics of the second. Those cases of fever in which the symptoms of the first stage were alone present, he considered simple inflammatory fever.

Dr. Blair states, that, "although the inhabitants of Georgetown who passed through the late epidemic had resided there during the epidemic of 1819, there was no instance of a sufferer from the epidemic of 1819 being attacked." That those who suffered from fever in the epidemics which he describes, after the ephemeral form was detected, were not so fortunate, we may infer from the following quotation from his book: "The disease, however, was frequently baffled, and returned; and the liability to a return was in proportion to the mildness or shortness of the previous attack."

Adult natives of localities in which yellow fever frequently appears, who were considered as inured to the disease, now experience attacks of the ephemeral type as readily as the latest arrived immigrant takes the typical disease. In addition to this, the epidemic of 1871 has demonstrated (if this classification be correct) that one attack of mild form of so called yellow fever, so far from protecting, leaves the individual subject, at the end of a time varying from a week to a month, to another attack, during the

same epidemic, and in strangers almost invariably of the severe form in which, in many cases, to lose life.

With these reflections, we venture to make a discrimination between the fevers which came under our observation during the last summer.

"The disease which forms the subject of our present inquiries does not vary in regard to its pathognomonic phenomena in whatever region or at whatever period in the same place it may show itself sporadically or in epidemic form." (La Roche.) This acknowledgment concedes to yellow fever a type of its own, by which its individuality, and claims to consideration as a special and specific disease, have been established. This type, though not invariably manifested by the same symptoms, still has always and in all localities been marked by such combinations, and groupings of phenomena, as to designate its true character. Like all other diseases, yellow fever assumes different aspects at different periods by the predominance of certain symptoms, or the absence of others, which have at other times been present in a more pronounced degree. Yet, even under these circumstances, the links which bind these symptoms and phenomena in the chain of morbid sequence, have been sufficiently strong to keep up the characters peculiar to it.

The epidemic under our consideration offered no exception to this rule. The disease manifested itself with its usual variations, still, however, clothed in its usual "livery." The pronounced cases differed in no way from those, which have characterized other epidemics; its predilections remained the same, and its features were sufficiently familiar to make its recognition prompt.

"The discrimination between yellow fever and other febrile complaints is a subject which under ordinary circumstances can prove of little difficulty to a physician familiar with the pathognomonic phenomena of the disease, and of those with which it is contrasted." (La Roche). The truth of this statement cannot be doubted with the premises required; remove the factor of ordinary circumstances, and the nature of things changes, though the other factors remain the same.

The epidemic of 1871 did not occur under ordinary circumstances, and the difficulty of discriminating the forms of fever which we have already described was great, so great, indeed, as to divide in opinion physicians very "familiar" with the "pathognomonic phenomena" of yellow fever. "In yellow fever, as in every

febrile complaint, there is an assemblage of phenomena which enables the experienced observer to ascertain its nature and discern its relations to other disorders." In an epidemic of yellow fever, when there is present a fever which is not possessed of this assemblage of phenomena, which runs its course at the same time as the well-known disease, and appears in some instances wearing its "livery," there is a difficulty which even the most experienced cannot remove in a manner universally satisfactory. Such a complication the ephemeral or break-bone fever brought about during the last year, and so remarkable was its course and behavior, that we deem it fit to bring it to your attention. It has been well said by Dr. Nott, that if a physician were called in the forming stage of a number of cases of plague, smallpox, yellow fever, some forms of typhus, and other diseases, arising from morbid poisons, as well as certain vegetable poisons, he would be much at a loss how to distinguish them for two or three days, and in some of those in which the characteristic signs are never developed, as smallpox without eruption, etc., a diagnosis never could be made. Let us apply this as a test to the ephemeral form of fever. In the large majority of cases, the disease terminated in eighteen to twenty-four hours, having manifested no symptoms, which would establish the family resemblance to yellow fever; hence, were its diagnosis as yellow fever dependent upon a linking of the febrile paroxysm with the subsequent stages described as characteristic of that disease, there would have been a failure to point out the likeness in the large proportion of cases. It is admitted, even by those who contend most warmly for the unity of the two forms of fever, that it would have been impossible to diagnosticate this ephemeral fever as yellow fever in the absence of its well-marked and typical companion. In illustration of this, we will mention that physicians of well-known acuteness of observation, who now hold the opinion that these fevers are one and the same, reported cases of the mild form of fever as ephemeral fever or febricula; called attention to the clear eyes, to the character of the headache, and clean tongue, and expressed the belief, that they were due to common causes, and had no analogy to yellow fever; and this, too, in the presence of typical yellow fever.

It must be admitted, then, that the break-bone or ephemeral fever was permitted by courtesy to a classification with yellow fever, and not by a recognition in its individual characters of sufficient claims to that position. Here, therefore, we have not to

deal with facts but theories; not with the symptoms, clinical history, and course of disease, but with philosophical speculations as to the causes of the diseases of which we are treating; namely, that, as other diseases manifest themselves in mild forms, so must also yellow fever; though in those mild forms it loses its likeness to the original stock. The true way, therefore, to carry on our investigation into the claims of these fevers to be considered separately, is to inquire into the behavior of this ephemeral yellow, or "prevailing fever," as compared with those epidemics not accompanied with such a wide-spread and extensively prevailing accompanying fever as in the epidemic under consideration.

Dr. Ramsay, in his *Medical History of South Carolina*, said of yellow fever, "with a very few exceptions, chiefly children, it exclusively fell on strangers." So marked was the exemption of natives from the disease, that it was denominated the "stranger's fever."

It is a generally admitted fact, that those persons who have lived in localities subject to frequent occurrence of yellow fever become inured to the climate, and enjoy immunity from the disease.

"With these facts before us, we are better prepared to understand, that, in places where the yellow fever is endemic, where the climate is continuously warm, and the causes of the disease are more or less permanent or frequently evolved, individuals accustomed by long residence to the influence of that climate, and the agency of those causes, lose their susceptibility to an attack. They become acclimatized or creolized, and are henceforward placed beyond the reach of danger." (La Roche.) Strangers, however, especially those from cold climates, afford to the disease its favorite food, and such but rarely escape attack on going into regions where the disease exists. Natives, also, lose their immunity, after residing for a lengthy period in cold regions. It is admitted, generally, that there are those who are privileged, and others who are susceptible to the disease, and such has been the experience in this city, in previous epidemics, with few exceptions.

In 1852, the proportion of persons, natives, attacked was greater than in former epidemics, but here, too, the question of an intermingling of break-bone was entertained. Native children have been those who have suffered from yellow fever in epidemics of previous years, and, as we have already shown, this obtained in the last.

The ephemeral form of fever of 1871 did not respect these limits,

which by experience have been considered laws with but limited exceptions. It attacked adult natives as well as children, and the foreigner and unacclimated as often as the native. Immunity is even claimed to be conferred by those very mild fevers, which are called seasoning. Be this as it may, the immunity said to be conferred by one attack of yellow fever has been compared to that enjoyed after an attack of smallpox. To this, as to other rules, exceptions occur; but the opinion is very generally held by authors. This claimed immunity has no protection against the mild form of fever we have described; nay, so numerous are the instances in which an attack of ephemeral grade was followed by a severe attack of yellow fever in foreigners, that they cannot be considered as simple coincidences. In some of these cases the last attack terminated the existence of the subject. The intervals by which these two attacks were separated, varied from one week to a month. Dr. Blair says of second attacks, "neither do I believe there is an instance of a second complete attack after a month's perfect restoration to health." The subjects of two attacks in the epidemic of 1871 were well enough during the interval to attend to their business; the second attacks cannot therefore justly be called relapses. Those who contend for the unity of the two forms of fever, and classify all as grades under the same head, account for these second attacks on the supposition that the first was due to a small dose of poison, the second to a larger. Such may be the true explanation, but the assertion is one which can be neither proved nor disproved by facts. It would appear to us, however, after a consideration of the facts stated in respect to the liability of a foreigner to be attacked with yellow fever in the locality of this disease, that this explanation cannot be admitted. In view of the fact that immunity is claimed after an attack of yellow fever, granting that a second should occur, it is reasonable to expect that the subject would have received some degree of protection by the first, or at least some amelioration of the severity in the second. This view would appear to us to be reasonable, by analogy with smallpox or vaccinia, which, though it may not give perfect immunity, generally grants an amelioration in the symptoms of the disease, should the subject undergo a subsequent attack of smallpox.

There is also another point to be considered as bearing upon the claims of the ephemeral form of fever of the last epidemic, to a position by the side of yellow fever. The mortality of yellow fever has varied as much as its symptoms in different epidemics,

but in the undoubted cases of the disease it has invariably been high. The mortality which always attends its presence has obtained for it a position as one of the most malignant and fatal of diseases, and given it a rank by the side of the oriental plague, and the great loss of life in proportion to the number of the sick has branded it as a fearful calamity.

"In this latter respect no disease, the black plague of the fifteenth century and the Asiatic cholera in our own days excepted, can compare with it. The oriental pestilence itself, though it occasioned, a century or two ago, a frightful mortality throughout many parts of Europe, and though it has given rise up to this day, at each epidemic return, to a mortality equally large in proportion to the number of individuals attacked, did not, at the time of its widest diffusion, or, if it did, has long since ceased to produce as great loss as has resulted from the disease in question." (La Roche.) It is true that the disease has at some periods presented itself in greater degrees of malignity than at others, but this fatality has always been one of the characteristics of the genuine disease. So firmly has this characteristic of yellow fever impressed itself upon the minds of writers and observers of the disease, that the unprecedented success of treatment claimed by Hastings and others has suggested doubts of the genuine character of the disease with which they had to deal.

Dr. Barton says: "It has been expressed to me by some of our oldest inhabitants, those who have been observers of the disease twenty or thirty years ago, that it was no longer the same disease, that in fact the unequivocal malignancy and peculiar type which characterized it exist no longer; and this is most amply verified by the symptoms, aspect, and history of the disease, as seen and described by those who had witnessed it from 1804 to 1832."

The epidemic of 1871 bears a most remarkable contrast, as far as malignity is concerned, with the former epidemics which have visited this city previous to 1849 and to that of 1858. As already shown, the proportion of mild ephemeral or break-bone fever to the marked yellow fever was large, and in the former there was no mortality. As to the marked cases of the latter, which corresponded with the history usually assigned to the stranger's fever, we cannot say the same, for the mortality in these varied from 5 to 40 per cent., and even much higher. These cases presented no change of type, but bore on their face their true character and family resemblance to the old stock.

How then are we to account for the mild fever? In answering this question we must review the characters of the epidemics of this city and note their variation.

Previous to 1849, the yellow fever remained unchanged in its type; when it affected strangers, it showed the same malignant features as that of the West Indies, and so also it did in 1858.

In 1850, break-bone or dengue visited Charleston, and prevailed in the form of a wide-spread epidemic. In 1852, when the yellow fever again appeared, it presented itself, accompanied with an unusual number of mild cases, which were recognized by many as bearing the stamp of the epidemic of 1850. That this is not merely a local tradition, we may see from the following quotation from Dr. La Roche's book. In speaking of the complications of yellow fever, he remarks: "The yellow fever which prevailed in Charleston in 1852 was accompanied by and blended with dengue or break-bone fever." In 1858, yellow fever presented itself again in its true garb, as may be noted from the fact that in a population of less than 60,000 there were 680 deaths.

Again, in 1866, there prevailed a wide-spread epidemic which attacked the great mass of the people, nearly every one being sick during its course, irrespective of acclimation. As we have stated, this disease did not present the type of yellow fever, and was variously classed as dengue, break-bone, relapsing, and sweating fever, and yet there were a few cases of sporadic yellow fever.

In 1871, yellow fever was again present in its unmistakable form, but accompanied by and blended with a fever which did not, by its symptoms or course, uncomplicated, demonstrate its family relationship to the former, except in the fact of its occurrence at the same time as the first.

The mild form of fever made its appearance first, which is in direct opposition to the usual history of other epidemics, in which this form presented itself, as the more severe disease died out.

It is true that the mild fever of 1871 did not present the course perfectly of dengue; but, on the other hand, it could not, except in the presence of yellow fever, be diagnosticated as belonging to the same group as the latter.

It can scarcely be denied, in view of these statements, that the epidemics have undergone a change of decided amelioration in their character. This change cannot be said to have taken place in the yellow fever proper, for we meet with it in its usual form. We are, therefore, for our part, compelled to seek for the explana-

tion of the unprecedented prevalence of mild cases, during the last epidemic, in the fact that, since the occurrence of dengue or break-bone, its impress has remained; and that these mild cases result from a combination of the yellow fever with the former, and the mild forms are the result of the mutual moulding—the special characters of one being more prominent in some cases, whilst those of the other are in the ascendency in the others.

Dr. Barton remarks: "Many instances were mentioned, and will be found in our records, of repetition of attack, and the liability of those born here (and not of creole parents, and some that were, and grown) were very numerous, more so than has ever been noticed before, even reaching the limits of adult life, and the dread of yellow fever began to be brought home, and even experienced by the fully developed natives. This has been attributed during the fever to the uncommon malignity of the disease. May be the opinion I have heretofore advanced is the true one, and I repeat, although in vivid recollection of the scenes of last year, that the clear and unequivocal type is not so distinctly manifested in the mass of cases as it was twenty or thirty years ago.

"A hope is entertained in Charleston, that from the liability to attack of the more advanced adults, and in proportion to this retardation of age, 'there exists the strongest possible proof that our circumstances are undergoing a change of nature calculated to sustain the opinion that yellow fever is gradually ceasing to be an endemic or climatic disease among us.' If this is true, I know no reason why it may not apply also here, ... the fever is becoming more indistinguishable from the ordinary fevers of the season and country."

With these observations, from such authority as Dr. Barton to sustain us, we feel less reluctance in expressing the opinion that we have advanced, namely, that the mild characters of the epidemics in Charleston since 1850 (except 1858) are due to the mutual modification with dengue.

Origin of the Epidemic.—In considering this portion of our subject, we will first investigate the facts relating to importation, as the possible means of the introduction of yellow fever into the city of Charleston in 1871, and we will draw largely upon the report of Dr. Lebby, Port Physician, for the facts. He says: "It is a remarkable fact, and an occurrence which has never taken place before in my experience, that from the 1st of May at sunrise, until the 25th of September, not one single case of sickness came into

the port of Charleston, nor an infected vessel. All the vessels from the West Indies were in ballast, with healthy crews and in good condition, including a few fruit schooners from Ilethuria, Harbor Island, Barracoa, and Nassau, where no fever has ever existed, except the last-named."

"The last arrival previous to the occurrence of yellow fever in the city was on the 25th of June, the vessel and crew in good condition and healthy. The only case of sickness was from scurvy, on a vessel one hundred and twenty days from Callao, which came in on the 25th of September."

The following shows the number of vessels that arrived and were examined at the quarantine in Charleston harbor, from the 1st of May, 1871, to the 31st of October, 1871:—

1871. Months.	Steamers.	Ships.	Barks.	Brigs.	Schooners.	Sloops.	Total.
May	26	...	6	11	22	1	66
June	22	...	6	4	26	...	58
July	28	...	3	7	18	...	56
August	23	...	6	2	17	...	48
September	22	...	2	2	20	...	46
October	16	1	4	2	18	...	41
Total	137	1	27	28	121	1	315

The following shows the localities whence they came and their condition upon arrival:—

1871. Months.	Coastwise.	England.	West Indies.	Malaga.	Callao.	S. America.	Total.	Number healthy.
May	52	...	13	...	1	...	66	66
June	50	1	6	1	...	...	58	58
July	56	...	...	...	...	...	56	56
August	44	3	1	...	...	...	48	48
September	43	1	1	...	1	...	46	46
October	35	2	3	...	...	1	41	41
Total	280	7	24	1	2	1	315	315

"From the above tables it will be seen that there was no arrival at this quarantine from the West Indies during the month of July. In June there were six, the last on the 25th. In August there was one arrival on the 24th. This vessel was quarantined thirty days

until September 23d. Except those from coastwise ports, all these vessels were quarantined twelve to thirty days, exclusive of the number of days they were at sea, and most of these were in ballast with perfectly healthy crews who continued so; several of the vessels did not go up to the city, but were towed up Ashley River, loaded with phosphate rock, and from thence proceeded to sea."

On the 20th of June, a quarantine station was established in St. Helena Sound, to the north of Morgan's Island, and equidistant from the entrances of Bull and Coosaw Rivers, distant between seven and ten miles from the settlements on Chisolm's and Hutchinson's Islands, and about sixty miles from Charleston. Dr. W. H. Bailey was put in charge as quarantine officer. I take the following from his report: "On the 30th of June, the barkantine Teresa, Captain Adams [with ten men] arrived from Havana with the first mate and one seaman convalescing, but still weak from fever. . . . . She was brought up by pilot Davis into Bull River; I visited her in Bull River, reprimanded the pilot for transgressing the quarantine laws (I did no more, because the quarantine had been but recently established), and ordered the vessel to the quarantine ground. She dropped down to that point, and remained there until the morning of the 31st of July, having been released on the 30th."

"On board the Teresa I found the first mate and a sailor convalescent but still weak from fever; the second mate quite sick (from fever, also), but just entering upon convalescence; and a sailor decidedly very sick. I could not then, nor am I willing now to, characterize this fever as yellow fever, although circumstances seemed to render such an opinion probable at least. The mates and the first sailor to whom I alluded, recovered; the last convalesced so far as to be able to walk about the deck, overate himself, had a relapse, and died on the 10th of July. This is the only death which had occurred at the quarantine ground, and, with one exception, the only white death which we have had on Bull River or its vicinity this summer. . . . . I have stated that there was one white death at Bull River this summer. The unfortunate victim was warned, as well by myself as by others, in vain; intemperance and an exposure brought on the attack. . . . . I am satisfied he did not die of anything that even resembled yellow fever. To this I am willing to make affidavit."

We have evidence that the Teresa did not impart infection at Chisolm's Island where the Mining Companies carry on their

operations. We have mentioned only the Teresa at St. Helena Island, as no other vessel from an infected port arrived at that station until August 17th, except the Raleigh, which arrived in June, and had previously been admitted to pratique by the officer at Hilton Head.

The first case of yellow fever, as we have already mentioned, was that of Lizzie Clark, at No. 10 Chalmers Street, who was attacked between the 16th and 19th of July, and died on the 25th, sixteen to nineteen days after the arrival of the Teresa at the quarantine station at St. Helena Sound. Between these points, Charleston and St. Helena Sound, there is difficult and not very frequent communication. This case was attributed by report to communication with the second mate of the Teresa. Dr. Ancrum, who attended this case, reported to the Medical Society "that the report was false which attributed her illness to communication with a man from a vessel infected with yellow fever at Bull River. The origin of the report was probably in the fact that six or eight months previously a young man who lives on Bull's Bay had been with her." In addition to this statement of the attending physician, based upon information obtained at the time, we have the following testimony from totally different sources.

Dr. Lebby in his report says: "On the 11th of July I boarded the Teresa at quarantine grounds, St. Helena Sound, and examined her captain and crew personally. Both of the mates were on board on the 12th of July when I passed in the steamer on my way back to Charleston. It was impossible for either mates or crew to arrive in Charleston before the 14th, and then only by way of the Savannah and Charleston railroad, a distance of twenty-six miles from the vessel's location, which renders their presence in Charleston almost an impossibility. But the testimony of the second mate and two of the crew, taken by Mr. David Lopez and Captain Henry J. Elliott, gentlemen of the highest respectability, in whose employ at the Coosaw Works these men are now, will show the utter falsity of these rumors." The following questions were put and answered:—

1st. "Were either of the mates or any of the crew of the barkantine Teresa from Havana, in Charleston or Beaufort between the 30th of June and 31st of July?" "No."

2d. "During the time the Teresa was at quarantine did any of the men desert from her, and return back on board?" "No."

3d. "On her discharge from quarantine, and her arrival at the

Coosaw Works, how many men, captain included, were on board the Teresa? "Ten" [the complement of the ship on her arrival].

4th. "Did the mates and captain remain on board the Teresa until loaded, and proceed to sea in her? and were they ever in Beaufort or Charleston to your knowledge or Capt. Elliott's?" "*They did remain on board,* except Captain Adams, who visited Beaufort on the night of August 14th, and went to Charleston next day by Charleston and Savannah Railroad, and returned on the 17th by steamer Pilot Boy, and got on his bark, and was never ashore after. The second mate and two seamen have been employed at the Coosaw Works since the bark left quarantine."

It is evident, therefore, that by the mate's own statement, corroborated by the evidence of others, he did not go to Charleston, and as a necessary consequence had no communication with Clark. Capt. Adams, the only person of the ship's company who did go to Charleston, did not arrive there until the 15th day of August, before which time, as we have stated, yellow fever was present in this place. The barkantine Teresa must be acquitted from the charge of having introduced yellow fever into Charleston.

There is yet another report which must be considered in this connection. That the crew of a vessel in Bull River from Havana deserted their ship and were arrested on their arrival at Charleston. There was ground for this report, in so much as that a desertion took place from a ship, but not from a vessel from Havana. In proof of this we will again extract the facts from Dr. Lebby's report. He gives the written statement of Captain John Johnston, a shipping broker of this city, who says, "I shipped from this city, on the 28th of August, seven white men for the bark Raleigh, loaded with phosphate rock in Bull River and ready for sea. The second or third night they took the 'ship's boat,' deserted and returned to Charleston; after their arrest the Captain refused to receive them, and I shipped seven colored men in their place, when she went on her voyage."

There are three reasons why this occurrence cannot be taken in evidence as favoring the hypothesis of importation. 1. The men went from Charleston. 2. They remained only two days on board the ship, which had been admitted as in a healthy condition at Hilton Head. 3. And, most important, this desertion took place nearly thirty days after yellow fever had been developed in the city of Charleston.

As will be seen by reference to the tables of arrivals at the port

of Charleston, already introduced, the last arrival from the West Indies, preceding the outbreak of yellow fever, was on the 25th of June, and the ship was in good condition, with a healthy crew, and with no history of sickness, previous to her arrival, on the voyage. It appears to us that it would be unfair to attribute the disease to this ship, for it did not exist in her at the time of her arrival, and she had not suffered before, and did not afterwards suffer from it, and especially as she was in ballast.

Were this not sufficient to convince, the evidence is completed by the fact that the disease did not begin its attack on those who were likely to be brought into connection with the shipping, but first appeared in a location distant from the wharves in a part of the city, the situation of which does not bring it in connection with the commercial portion of the community. It is, moreover, stated, on the authority of the Rev. Mr. Yates, seaman's chaplain, whose works of humanity and philanthropy, especially among the sailors, are well known in our community, and who has had much experience in the epidemics which have visited this city, that there was not a single case of yellow fever occurring among the sailors until the middle of October, and then not exceeding three.

The second case occurred on the 29th of July, at Mr. Claussen's steam bakery in Market Street, in the person of a cake baker. It is not natural from the character of this man's employment that we should expect to find him engaged on shipboard, and in any way connected with the shipping. We have been informed, on inquiry at Mr. Claussen's, that this man had not been in any way exposed to such infection, and that his employment did not even require his presence in that portion of the establishment where he would have come in contact with others who might have been engaged in the shipping. It was not until a number of cases had already been developed that we met with the disease among the fruit dealers, who have their depots on Market Street and East Bay.

We have not in the history of this epidemic those instances of laborers engaged in loading and unloading ships as the first affected, which have in some of the former epidemics furnished the grounds of argument to those who espouse the cause of importation to the exclusion of any other mode of origin for yellow fever.

The Marine Hospital played no part in the history of this, as it did in some of the former epidemics.

There is another fact which will prove of interest to those who

devote much thought to the origin of yellow fever. In the report of the Registrar of the City of Charleston we find this statement: "The first death from yellow fever in New Orleans, in 1871, took place on the 4th of August, the last on the 4th of December." The first undoubted death from yellow fever in Charleston took place on the 3d of August, and Clark, the case reported as icterus, died on the 25th of July. The last death was on the 6th of December. This might be considered as a mere coincidence but for the fact which we will now state.

Dr. R. A. Kinloch, in an article on the yellow fever which appeared in 1857 at Mount Pleasant, *Charleston Medical Journal*, January, 1858, says: "The bills of mortality of the two cities of Charleston and New Orleans, up to the middle of September, proved them to be exempt from yellow fever. But after this date we find the disease appearing in both of these cities about the same time, and prevailing to a very limited extent, proportional in each to their population. Is it likely that germs of a foreign disease should have arrived simultaneously in both places? If they did, it was a remarkable coincidence."

In 1871 we again have a repetition of this "remarkable coincidence." To us it has a significant bearing upon the origin of yellow fever, and goes far to substantiate the views of those who believe in the influence of geographical position.

Perhaps there is no subject in the scope of the science of physic which has been so thoroughly discussed, and has been the cause of more able and angry controversy, than the origin of yellow fever.

Since 1849, in Charleston, the line has been sharply drawn between those, on the one hand, who believe in importation, and, on the other, those who have put their faith in the local origin of the disease. Up to a comparatively short period no middle ground was allowed; the contest was, importation against local origin, and on this ground rested all controversies.

We do not propose to enter into this contest, nor to deny the portability of yellow fever, and its propagation under favorable circumstances, but we cannot admit this as the only or general origin of the disease, at least in this locality.

The epidemic at Wilmington, North Carolina, in 1862 (an account of which, by Dr. Wragg, can be found in the *New York Medical Journal* for August, 1869), goes far to prove local origin, and it must be admitted that the condition of that city at the time of the outbreak was eminently fitted to produce disease. Few can read

the accounts of that epidemic without being convinced that, in the face of the fact of the occurrence of several cases of yellow fever, before the arrival of the steamer Kate, to which the importation of the disease is by some assigned, the charge cannot be sustained.

The epidemic of 1871 has unequivocally eliminated the factor of importation from the influence which brought about the disease, and even the most enthusiastic importationists are dumb. Beyond this, the epidemic of which we have treated has produced no new fact which bears upon the peculiar and specific cause of yellow fever. The same mystery still hangs about it which has always invested the subject, for the discovery and unravelling of which the noblest minds have labored in vain. That importation, so far as Charleston is concerned, is not sufficient to propagate the disease, is proved incontestably by the history of the outbreak in 1854.

On the 11th of May, the Isabel arrived from Havana and Key West. Three days after her arrival, a steerage passenger, who had been taken in at Key West, was sent to the Marine Hospital with well-marked symptoms of yellow fever; he recovered, but threw up black vomit freely. He was placed in a ward with others sick of other diseases, and no propagation of the disease occurred, either by contagion or by infection. On the 11th of July, the Isabel again arrived from the same ports, one of her passengers, an Irish nurse, went to the Pavilion Hotel, at the corner of Hasel and Meeting Streets, in the heart of the city, complaining of the effects of sea-sickness. On the following afternoon she attempted to leave in one of the New York steamers, but was prevented by her extreme illness. She was sent to the lazaretto the same evening, and died that night, throwing up black vomit freely. Again there was no extension of the disease. On the 26th another vessel arrived from Havana. It was not for some time after, that yellow fever appeared in the city.

It is evident, then, that some factors other than importation are necessary to produce an epidemic.

Heat and moisture, or dryness with animal and vegetable decomposition, and absence of electricity from the atmosphere, have been invoked to solve the problem, but the difficulty yet remains. What is the subtle combination of telluric and atmospheric influences necessary to produce yellow fever in epidemic form yet remains a mystery, and cannot even now be more satisfactorily explained than by the trite expression of Sydenham, "an epidemic condition of the atmosphere."

Having failed to prove importation in 1871, we must look amongst ourselves for the cause of the disease. Next to importation must be considered the question of propagation from dormant germs. The theory of germs as applied to disease is yet an open question, especially in its relations to yellow fever; we will not, therefore, enter into it. There are, however, certain facts in relation to its bearing on the epidemic of 1871, which should be mentioned.

The germ of yellow fever, if it does exist, and whatever it may be, should be specific, and as a consequence must be the result of the propagation and germination of its like. It is most natural, if this proposition be granted, to look for the parent in the next preceding epidemic, which is that of 1864. Granting that the germs of this epidemic escaped the wilting cold of our winters, there is yet an obstacle to their acceptance as the cause of the disease of 1871.

In 1864, Charleston was in a state of siege; its lower portion from Calhoun Street to the White Point Garden was under the fire of shells, and deserted by its population. The streets of this section, and the waste places left by the disastrous fire of 1861, were overgrown by the natural spontaneous growth of weeds, which reached to the height of a man's head, giving to the locality the appearance of a deserted city. The people had collected in the upper portion of the city, above Calhoun Street, which extends east and west from river to river. Here it was that the yellow fever prevailed, and not in the lower districts, which were uninhabited except by the small garrisons which acted as guards to the batteries on White Point and the Cooper River.

The fever is said to have begun in the northwest portion of the city, in 1864. In 1871, as we have already shown, it commenced its attack in the southeast, and prevailed in the lower districts to a great extent before a case appeared in the upper wards, which had been the scene of its action in 1864.

Although we do not propose to enter into a discussion of the causes of local origin of yellow fever, there are some facts in the history of the fever, in its connection with Charleston, bearing upon this point, which should be mentioned. We allude to the close connection of the disease with reclaimed land, and the filling of low places with the offal and scavenger accumulations of a closely inhabited city.

"The site of Charleston in its natural state was a slip of land

stretching southeastwardly between two rivers, and projecting into the harbor formed by their junction, and divided into a number of peninsulas by creeks and marshes, indenting it on three sides so as to leave but little unbroken highland in the middle. (*Ramsay's Medical History of South Carolina.*) Under these circumstances the town was a prey to malarial fevers, which rendered it almost uninhabitable from June to October. By the process of filling and building, these fevers gradually diminished, and at the present day have disappeared. Dr. Ramsay continues, in speaking of this amelioration produced by this process, "From the operation of these causes a change for the better has already taken place to a certain extent." "With the exception of the more frequent recurrence of the yellow fever, Charlestown is more healthy than it was thirty or forty years ago. . . . . Bilious remittent autumnal fevers have for some time past evidently decreased."

It has been attempted of late years to explain the disappearance of malarial fevers from Charleston, on the supposition that they were chased away by the more powerful yellow fever; but this explanation scarcely accords with the observation of Dr. Ramsay, just recited. It would appear to us that by the very process by which the one was diminished, the other has been increased. In illustration of this view, we will mention certain facts for which we are indebted to the reply of Dr. Wragg, 1859, to a letter from Alderman Robert Lebby, M.D., addressed to certain members of the profession of Charleston, asking their opinions on several questions as to yellow fever.

In 1833, yellow fever was localized and bounded by lines, which, although they may have been overstepped in some points at times, were nevertheless tolerably accurate limits to the infected district. The southeast part of old Charleston was the doomed territory, and Water Street on the south, King Street on the west, a line somewhat below Calhoun Street on the north, with Cooper River on the east, formed its boundaries. The west end of Broad Street was considered safe, and all that part of the city known in old times as Harleston's Green, lying west of Rutledge and north of Beaufain Streets, was still more exempt. Cannonsborough, still further north, was a safe resort for strangers, provided they did not go far enough up on the neck to incur risk from country fever. The same may be said of Mazychborough, Wraggborough, and Hampstead, on the east of the city, and also of the intermediate central ridge from the citadel and St. Paul's Church, upwards until the

region of country fever was reached. As late as 1838, it was safe for strangers to remain in the city in yellow fever seasons, provided they did not go below Calhoun Street. At the present time there is not a location within the city boundaries which can be said to be free from liability to the disease. In former times it did not intrude upon these regions which were blest with a peculiar immunity, but in 1838 the spell was broken, and safety was no longer found in one at least of the favored precincts. Cases of the disease occurred in the neighborhood of Judith and Elizabeth Streets, this year, for the first time. We quote from Dr. Wragg's letter above referred to.

"Let us look around and see if any local changes in the region about the houses may have had influence in producing them. A year or two before John Robinson had commenced the improvement of his lots partly on Judith Street, and in the square bounded by Elizabeth Street on the west and Alexander Street on the east; these lots were low and were near the mouth or outfall of a long narrow marsh flat, which, commencing here, ran from an eighth of a mile westward, as far as King Street. The natural effect of the filling up of these lots was to injure the drainage of all that part of the marsh flat lying west. So completely was this effect produced, that frequent inspections were held yearly for the purpose of remedying the nuisance, but in vain, since the stoppage of the natural drainage could only be compensated by artificial drains of sufficient size and depth to take off water, while at the same time provision should be made for improvement of the low ground above. But as there was no authority or means to carry this into operation, the nuisance became more and more intolerable from year to year." "For the improvement of his lots Mr. Robinson had used wood and other destructible material to a considerable extent, and had also transferred by means of a temporary railroad the whole of the mound of earth (a remnant of the old times) which formerly stood at the corner of Meeting and Mary Streets."

"From this time the exemption previously enjoyed by this region vanished. Since then we have not only seen yellow fever claiming its victim there, but typhus, scarlet, and other epidemic fevers have from time to time severely scourged it. About the time of which I am speaking, the eastern end of Calhoun Street was in the enjoyment of a reputation for health not inferior to any other portion of the neck. I well remember, that, in 1836, when cholera made its visitation to Charleston, I only saw a single case

in that part of the street where the free ebb and flow of the tide over the low grounds kept them clear of decomposable deposits. Within the last ten years the street has been made up with wood and the low lots filled with chaff, sawdust, and such destructible material, and now the neighborhood has lost its reputation for health. Within the last twenty years, during which time the work of filling up low places with garbage, sawdust, chaff, etc., has been going on on Gadsden's wharf, that place has been steadily becoming more and more unhealthy, till last summer the work of death was so actively carried on that the population was almost decimated. Since the filling up of White Point Garden with the same destructible materials, yellow fever has got a foothold along the formerly healthy region of South Bay . . . . The same observation holds good for all the shore line of the Ashley, and accordingly we see victims of the disease in Legare, Gibbes, Tradd Streets, etc., and when you reach the low grounds extending from Tradd Street on the south to Beaufain Street on the north, and from Franklin on the east to the river on the west, you come to one of the most infected of all the districts of the city. . . . . You will remember that this very spot was referred to above as one of those in which even the stranger felt secure in former times from yellow fever. The change that has taken place is its conversion from a marsh overflowed twice in twenty-four hours by pure sea water into a porous, putrefying, undrained soil, composed almost wholly of the offal of the city. . . . . The jail and Marine Hospital have occupied their relative situations for fifty years. During the whole of this long period the hospital has received and treated yellow fever patients; while I was a student I have taken my first lessons in the disease at the bedside of patients who might have almost jumped from their beds into the inclosure of the jail; but never was the yellow fever known to have entered that building till 1852; since then it goes into it as regularly as into the houses of Elliott Street. Let us turn to the condition of things in the neighborhood, and we will find just such a change as has been shown to have been the precursor of the introduction of yellow fever into all the other locations referred to above. And the remarks made in reference to the jail hold good with regard to the private residences around these buildings. The offal of the city makes the soil all around. . . . . It has been stated above that the once healthy region known as Harleston's Green is no longer exempt from epidemics of yellow fever. The same local changes have taken place there.

Low places have been filled up with the usual mixture of animal and vegetable compost, and while the pure tide water of the ocean has been excluded, its healthful presence has been replaced by filth, corruption, and putrefaction. . . . . This region previous to the changes I have been tracing was a country fever district. It at once became the nidus of yellow fever."

We have introduced this long extract for the reason that it contains facts historical of the march of yellow fever in the city of Charleston. That the influences above mentioned are great in the production and spread of yellow fever, the fact of the occurrence of epidemics after large fires goes far to prove. The first appearance of the disease in Charleston in 1699 or 1700 followed upon the "calamities resulting from a disastrous fire and a fatal epidemic of smallpox."

The municipal authorities, taught by the hard lessons of experience the truth of the deductions mentioned above, passed the most stringent laws forbidding the use of such material in filling up and improving lands; which, if they could not undo the damage already done, would prevent the further extension of the evil. From 1861 to 1865 the exigencies of war prevented the proper execution of sanitary policing, the evil results of which negligence culminated in the epidemic of 1864. Since 1865 these laws have been treated as a dead letter, partly from the necessity of filling up lots which had been dug out to furnish earth for the building of the numerous batteries which dotted the sea face of the city, partly from the ignorance of the traditions of the city on the part of the executive officers of the municipal government, many of whom dated their residence in this city but a few months back. Lands were reclaimed and stolen from the domains of the tide-water; the materials used in this improvement of property being the same disease-generating putrescent compost of garbage and city offal. In 1869 the work was begun of filling and reclaiming certain water lots composing Bennet's millpond, covered in the natural state by tide-water let in through floodgates. These water lots are situated in the northwest portion of the city, bounded on the north by Vanduhorst Street, south by Calhoun Street, east by Smith Street and the rear of lots on the west side of the last-mentioned street already built upon, and west by the rear of premises fronting on Rutledge Avenue. By the order and with the consent of the then Mayor, the city scavengers were ordered to deposit the accumulations of city garbage and offal on this spot. On a reference to the

records of the City Council, February 23d, 1869, we find two memorials from citizens residing in the neighborhood, bitterly complaining against the procedure, for the reason that the "stench arising from the large quantity of offal collected is already offensive, and we believe will be the cause of much sickness as the weather becomes warmer." "The number of buzzards collected by the carrion seriously damage the water of the cisterns by defiling the neighboring sheds." At the urgent solicitation of these memorialists, a committee of five of the prominent medical men of the city was appointed to investigate the matter, and through their chairman, in a report, set forth at length the injurious results to be expected from the process of decomposition which would ensue, and recommended the immediate cessation of the work and the covering of the deposit already made by dry sand. This was done, not, however, until too late to prevent much mischief, which was manifested by the occurrence of typhoid fever in the neighborhood soon after. In the latter part of June, 1871, Vanduhorst Street, from Rutledge Avenue to St. Philip's Street, was graded, covered with large stones, and the interstices betweeen them filled with small stones. Over this was spread the black mud, containing the results of the drainage and filth of the neighboring premises, taken from the tidal drain in Coming Street. About the same time, lots on the corner of Rutledge and Calhoun Streets were prepared for building, by laying on the mud of the water lots beams of wood side by side, and these were filled upon by shavings, sawdust, and black earth. What was the result of all this? We learn from the report of the City Registrar that fifteen cases of yellow fever occurred in Pitt Street, and many deaths in its vicinity. This street passes from Vanduhorst Street, and runs parallel with Smith Street on which the offensive lots are situated, and one square east of it.

Let us go from here to Market Street, where the yellow fever showed itself in its most virulent form. On the 11th of July during the absence of Dr. Lebby, the City Registrar, a new drain was constructed one hundred and twenty yards east of Meeting Street and about one hundred and fifty yards from Mr. Claussen's. On opening the main sewer with which the new drain was to be connected, so offensive was the stench, and so noxious the gases which were diffused, that the workman who was engaged in the work was removed in an insensible condition and suffered a severe illness. Next to Mr. Claussen's establishment, and separating it from that

of Campsen & Co., is an alley known as Rafer's Alley, running north and south from Market to Guignard Streets. The condition of this alley has been described to us by the employés of Mr. Claussen as having been most filthy previous to the outbreak of the yellow fever, and the stench arising from it very distressing. The drain which passes through its length had caved in, and the noxious gases which arose from it were diffused in the atmosphere of the neighborhood. This alley had already been reported as a nuisance, and the neighbors, fully impressed with the necessity of remedying it, had offered to the municipal authorities to share in the expense of its repair. We learn from the report of the City Registrar for 1871, that, with the exception of part of Tradd and Thomas Streets, the sewers are filled up to the crown of the arch, and in the large majority have not been cleaned since 1859 or 1860. In addition to these fruitful causes of disease, the meteorological phenomena of 1871 were eminently suitable to convert into an epidemic any disease capable of assuming this form in the summer season. In May, June, and early part of July there was extreme heat and dryness, which continued nearly forty days. Only 1.47 inches of rain fell, at long intervals and in light showers, with a mean temperature of 83.84°.

Between the early part of July and 1st of August there was a period of intense heat, the thermometer rising to 102° on July 10th. From the latter part of July to the end of October there were heavy rains and a noted absence of electricity. During the four months, July, August, September, and October, there was a rain-fall of 27.20 inches, and a range of temperature from 57° to 102°. During the rains of the last of July and beginning of August, the collections of water in the cellars and burned district were so extensive as to require the use of the steam fire-engines continuously for days to remove it. In some localities as fast as the water was removed from the cellars they were refilled by the percolation of the subsoil water, and in some instances they had to be pumped out three or four times. On Market Street the cellars of the fruit shops were in an extreme degree of filth. They are dug in the made land, of which a large part of this portion of the city is composed, and their contents of cabbage leaves and other refuse attendant upon shops of this kind, when saturated with the water of the heavy rains, acted upon by a burning sun, produced a state of things not easily described.

Yellow fever also visited the town of Beaufort in 1871. In the

recollection of the oldest inhabitants, this town has been visited only three times by this disease; first in 1817, next in 1854, and in the last year.

The first case occurred on August 6th, in a man, who was brought from Bull River, sick with fever, and died on the 17th with marked symptoms of yellow fever. The disease ran its course from this time until November 21st, when the last case terminated fatally. "There were forty-one cases among the whites, and one colored; seven of these (whites) died." We regret that we are unable to enter into the details of this visitation, by reason of the absence of the necessary data.

It is a matter of regret that we have not obtained more extended statistics from other parts of the State in relation not only to the meteorology but the diseases that may have prevailed during the period of which we have treated, hence, we have been obliged to be restricted in this report principally to Charleston.

Inasmuch, however, as the disorder we have chiefly discussed, not only a scourge to the people of Charleston but a terror to all strangers who may have propinquities towards the city, has occupied so much attention both at home and abroad in scientific and other circles, we may find some compensation for the paucity of other interesting materials from different portions of the State.

Whatever may be the origin of the epidemic in the consideration of which we have been engaged, those who would lend their energies to the prevention and removal of the agents likely to contribute to the diffusion and continuance of the distemper before it does assail us, although they may not succeed in excluding it altogether, would confer a blessing not in health only, but in all the avenues of comfort and prosperity, which would entitle them as well to the gratitude of our people as the universal commendation of all the humane.

REPORT

ON

CLIMATOLOGY AND DISEASES OF CALIFORNIA.

BY

F. W. HATCH, A.M., M.D.,

SACRAMENTO, CALIFORNIA.

REPORT ON CLIMATOLOGY AND DISEASES OF CALIFORNIA.

"CALIFORNIA contains 98,240,000 acres. About one-third—33,000,000 acres—have been surveyed. It is estimated that 89,000,000 acres are suitable to some kind of husbandry. Of these, 40,000,000 acres are fit for the plow, 49,000,000 for grazing, fruit growing, and other purposes. The area of California exceeds that of Great Britain and Ireland, or the peninsula of Italy."

It extends from lat. 42°, on the north, to lat. 32° 30′ (nearly), on the south, and from the Pacific Ocean easterly an average width of two hundred miles.

It has a coast line of something like seven hundred and fifty miles in length. In view of this vast extent of territory, its diversified topography, its varied resources, its mineral wealth, its commercial and agricultural advantages, and especially in view of the fact that the attention of immigration has latterly been attracted hither, it is important that reliable information should be disseminated in regard to its climate, and the inducements it affords for pleasant and healthful occupation.

The general advantages of California as a home for the immigrant, the wonderful development of its agricultural facilities, and its ascertained availability to the cultivation of so great a variety of products, have been made, under appropriate auspices, the theme of the most elaborate essays, and information touching these and kindred topics has been widely diffused. The climatic history of the State is not less important than that which relates mainly to its industries. The elements upon which the former depends are as diversified as the latter. Its topography is as varied, its transitions in temperature, in different sections, are as great, and, not unfrequently, as abrupt, as any which characterize the productions of its soil, and its capabilities for the cultivation of grain and fruit.

Not to speak of the proper and normal gradations of tempera-

ture between the northern and southern sections of the State, extending through nearly ten degrees of latitude, let us consider the simple fact, that, even in the former, the observer may pass, in the summer season, in the space of a few hours only, from localities marked by an almost tropical heat to those of perpetual snow; that during the winter, while he is preparing his fields for grain or pruning his vines for the coming harvest, but a few miles distant, others are equally busy cutting and storing away ice for the approaching summer, and some idea may be formed of the diversity of climate, the abruptness of the transitions to which we are subject.

In a former report to the Association, we endeavored to portray some of the principal and more prominent features of portions of the State—of the valleys and mountains of central California—considering the valley of the Sacramento as a type of the one, and the summit of the Sierra Nevada of the other. A brief allusion was also made to the more southern localities of Santa Barbara and San Diego. On this occasion, we propose to extend this review, and, so far as the observations and information at our disposal will permit, to elucidate the climatic character of a still wider range of territory.

It is to be regretted that full statistical facts illustrative of this interesting subject are limited to only a few separate localities. For some, especially deserving notice in a medical and sanitary point of view, they are entirely wanting. For others, as the more southern valleys, to which attention is being now particularly attracted on account of their delightful atmosphere and their almost marvellous fertility of soil and variety of products, they are but limited in extent, and generally deficient in regularity.

The meteorological statistics contained in the Table which immediately follows, have been kindly furnished us by General Montague, Chief Engineer of the Central Pacific Railroad, under whose direction they were taken, along the lines of the several roads. These roads, consolidated under and controlled by one great corporation, run through the most populous and important sections of the State. They extend, from San Francisco, on the coast, to Tehama in the northern portion of the great valley of the Sacramento, and from Sacramento City, the capital of the State, easterly, over the vast chain of the Sierra Nevada Mountains to Wadsworth, in the State of Nevada; passing through, in this course, what may properly be considered, in a medical point of view, the

typical sections of the State—the extensive valleys of the San Joaquin and Sacramento on the one hand, and the mountains on the other. The general topography of the country, and the course which the observations more especially follow, may be seen by the map, which has been prepared with care, and is the result of actual survey. It is based upon the explorations of Prof. Whitney, the State Geologist, and, taken in connection with the diagram of the elevations, will materially facilitate a proper and intelligent understanding of the subject, and the allusions to special localities spoken of in the report.

The inhabitants along this route are subjected to climates as different from each other as is the diversity of the topography of the country through which they pass.

Meteorological Table for Twenty-two Mountain and Valley Localities in California, 1871.

	JANUARY.										FEBRUARY.										MARCH.									
	Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.	
	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.
San Francisco	..	..	..	51.5	63.	34.	..	2.34	..	..	..	..	..	57.3	65.	38.	..	3.55	..	..	..	..	..	55.7	72.	39.	..	1.26	..	..
Niles	..	..	..	..	..	..	..	..	..	..	42.	54.9	45.7	47.5	68.	36.	6	2.12	..	..	48.1	63.4	51.	54 1	78.	40.	4	.27	..	..
Livermore	43.1	59.3	47.6	50.	74.	30.	6	1.42	..	..	48.2	58.1	52.4	52.9	72.	37.	6	1.93	..	..	51.6	66.	55.	57.5	88.	43.	5	.36	..	..
Ellis	46.2	56.8	46.1	49.7	62.	40.	..	..	..	..	39.3	58.	45.5	47.6	66.	30.	6	1.41	..	..	53.2	68.3	52.9	58.1	80.	42	6	.22	..	..
Stockton	38.1	58.9	44.	47.	68.	28.	5	1.23	..	..	40.2	59.4	48.	49.2	69.	33.	7	1.42	..	..	47.2	69.4	54.4	57.	85.	36.	4	.005	..	..
Modesto	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	47.8	64.2	51.5	54.5	85.	35.	7	.115	..	..
Marysville	..	..	..	..	..	..	..	..	..	..	43	57.6	49.7	50.1	70.	34.	6	1.21	..	..	49.7	71.1	64.7	61.8	90.	41.	5	.29	..	..
Chico	39.3	59.	43.7	47.3	72.	27.	7	2.36	..	..	40.6	56.3	46.2	47.7	66.	33.	11	3.53	..	..	60.7	62.5	54.3	59.1	78.	37.	5	1.17	..	..
Tehama	..	..	..	..	..	..	..	..	..	..	39.4	56.7	49.3	48.4	65.	32.	4	1 60	..	..	48.1	62.8	56 5	55.8	74.	39.	5	.81	..	..
Miller's Ranch	..	..	..	..	..	..	..	..	..	..	42.5	54.6	48 5	48.5	64.	31.	6	2.39	..	..	45.4	67.1	56.5	56.3	83.	33.	7	.90	..	..
Sacramento	44.7	62.6	38.1	45.1	..	..	9	1.95	..	..	47.2	54.1	39.3	47.2	..	..	11	1.84	..	..	54.3	62.4	35.9	50.9	..	..	8	.98	..	..
Rocklin	38.8	60.4	38.	45.7	68.	31.	5	3.85	..	..	46.4	60.4	45.	50.6	70.	40.	4	1.71	..	..	55.9	69.6	51.	58.8	80.	38.	3	.95	..	..
Auburn	40.	56.4	44.9	47.1	68.	27.	4	7.21	..	..	38 9	53.1	44.3	45.4	65.	30.	9	1.86	3	4.96	45.5	59.	50.4	51.6	74.	36	9	1 85	..	..
Colfax	41.3	55.3	42.9	47.5	70.	24.5	5	7.24	..	..	37.6	50.3	42.6	43.5	62 5	28.	9	3.15	2	17.	43.7	56.6	47.9	49.4	79.	33.5	9	4 30	..	..
Alta	36.3	46.6	37.4	40.1	62.	29.	3	5.10	..	..	35.7	43.2	40.	39.6	60.	29.	4	3.65	4	19.	..	..	..	..	..	..	..	..	..	..
Emigrant Gap	37 9	..	33.7	..	..	23.	..	1.75	6	40.	30.	35.5	33.3	32.9	45.	20.	..	..	8	71¼	34.	43.4	37.7	38.4	58.	25.	3	.85	4	19
Cisco	27.4	36.8	30.4	31.5	48.	12.	..	..	4	64.	24.3	33.2	20.7	26.	42.	9.	..	..	8	84.	28.8	37.3	31.8	32 6	45.	15.	..	..	7	24
Summit	22.9	33 9	24.6	27.1	47.	5.	..	..	7	76.	19.9	30.2	22.	24.	41.5	8.	..	..	10	75½	24.9	36.	24.6	28.5	48.	9.5	2	.05	16	40
Truckee	14.6	39.1	22.9	25.5	45.	11.	2	.70	10	41.	15.7	38.	23.	28.3	46.	—10.	1	.50	7	37½	25.	41.6	29.4	32.	49.	10.	4	.78	8	24
Boca	14 4	44.6	27.8	28.9	65.	18.	..	..	4	24.1	15.5	47.9	28.7	30.7	60.	0.	..	..	4	23.	29.	52.9	37.2	39.7	70.	10.	2	.10	4	10.5
Reno	26.1	47.7	28.3	34.	60.	4.	2	.37	3	4.	27.3	46.6	29.7	34.5	58.	18	..	..	5	11.	32.2	50.9	37.7	40.3	60.	22.	..	..	..	..
Wadsworth	22.	45.9	28.5	32 1	61.	6.	1	.20	..	..	24.5	46.4	27.3	32.7	61.	10.	..	.25	2	..	35.6	57.6	40.6	44.6	72.	18.	..	..	2	..

Meteorological Table.—Continued.

	APRIL.										MAY.										JUNE.									
	Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.	
	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.
San Francisco..	..	..	..	56.4	73.	41.	..	2.5	..	..	..	..	..	57.9	74.	43.	..	.31	..	..	..	..	..	60.5	66.	46.	..	..	..	..
Niles.....	50.	62.4	49.4	54.	72.	42.	3	.82	..	..	54.	67.7	52.4	58.	88.	46.	..	..	..	..	59.3	75.1	54.6	63.	96.	48.	..	..	..	..
Livermore.....	54.	70.2	55.4	59.8	91.	39.	4	1.25	..	..	58.1	72 7	58.9	63.2	102.	39.	1	.02	..	..	69.4	88.	70.4	75.9	112.	53.	..	..	..	..
Ellis.....	62.8	72 4	58.1	64 4	88.	46.	1	.03	..	..	67.4	75.8	61.	68.	98.	52.	..	..	..	..	76.9	90.4	73.4	80.2	106.	58.	..	..	..	..
Stockton.....	51.7	72.	56.6	60.1	83.	40.	5	.74	..	..	58.6	75.8	59.4	64 6	94.	52.	2	.24	..	..	66.7	87.2	69.4	74.4	102.	54.	..	..	..	..
Modesto.....	..	..	..	..	..	..	..	..	..	..	61.9	75.3	57.7	61 6	110.	40.	3	.92	..	..	57.8	95.3	59.6	70.9	105.	48.	1	.04	..	..
Marysville....	53.9	77.7	70.2	67.2	90.	44.	4	.53	..	..	53.9	82.4	61.9	66.	96.	50.	3	1.	..	..	65.	94 6	80.2	79.9	115.	52.	..	..	..	..
Chico.....	51.3	69 5	57.4	59.4	80.	44.	5	2.13	..	..	57.8	74.9	62.8	65.2	89.	48.	4	1.12	..	..	69.7	92.4	75.7	79.2	112.	56.	..	..	..	..
Tehama.....	54.5	73.	61.5	63.	85.	43.	4	1.83	..	..	62.2	82.1	62.2	68.8	95.	47.	2	.45	..	..	78.9	97.2	76.7	84.2	110.	58.	..	..	..	..
Miller's Ranch	51.8	75.7	60.1	62.5	86.	40.	5	1.44	..	..	62.3	81.	71.8	71.7	96.	50.	5	.27	..	..	70.4	102.	82.8	85.1	119.	54.	..	..	..	..
Sacramento...	57.1	67.6	49.3	58.	..	..	8	1.04	..	..	59.2	71 2	33.	54 4	..	..	4	.55	..	..	61.9	83.7	68.6	71.4	101.5	54.	..	..	..	..
Rocklin	59.5	72.7	56.9	63.	88.	47.	5	2.04	..	..	62.7	78.8	63.4	68 3	95.	53.	4	1.06	..	..	72.5	92.7	74.4	79.8	110.	60.	..	..	..	..
Auburn.....	49.6	64.	53 9	55.8	80.	34.	5	3.57	..	..	55.6	69.	58.8	61.	85.	45.	5	2.06	..	..	69.	83.5	71.1	74.5	102.	53.	..	..	..	..
Colfax	49.4	63.1	50.8	54.4	77.	34.	6	4.03	..	..	56.6	69 8	54 8	60.4	85.	44.	6	2.55	..	..	69.8	86.1	70.9	75.6	100.5	52.	3	.13	..	..
Alta.....	46.1	..	51.6	48.8	63.	34.	..	..	..	..	57.	..	57.5	..	75.	37.	3	..	..	..	74.	..	74.7	..	95.	51.	..	..	..	..
Emigrant Gap..	38.8	48.6	44.5	43.9	60.	29.	4	0 80	3	27	46.2	58.	51.6	51.9	76.	34.	8	3.24	..	..	62.6	74.8	66.2	67.8	89.	42.	1	.41	..	..
Cisco.....	31.9	41.6	36.6	36.7	54.	18.	1	1 25	3	18	41.	51.4	42.	44.8	65.	32.	7	4.05	..	..	..	..	..	..	..	..	..	..	..	..
Summit.....	33.1	42.4	28.	34 5	65.5	12.	..	..	5	40	..	..	..	..	..	..	..	..	..	..	59.9	72.6	53.2	61.9	88.	25.	1	.89	..	..
Truckee.....	31.9	54.5	31.2	39.2	65.	15.	..	..	4	20	35.	63.6	34.	44.2	76.	28.	4	2.62	..	..	49.6	74.6	52.8	59.	92.	18.	..	..	..	..
Boca.....	33.8	61.8	42.7	42.7	80.	25.	1	.20	2	2.5	40.2	65.4	51.7	52.4	80.	30.	..	..	..	..	46.9	83.4	55.4	61.9	99.	28.	1	.10	..	..
Reno.....	40.6	58.1	47.4	48.7	76.	28.	..	..	1	3.	62.2	78.3	61.1	67.2	96.	40.	..	..	..	..	67.	88.5	66.5	74.	100.	48.	1	.10	..	..
Wadsworth...	43.3	60.	46.1	49.8	76.	23.	..	..	2	4.	54.4	72.7	54.9	60.6	98.	42.	3	.40	..	..	65.8	83.	65.1	71.3	100.	44.	2	.47	..	..

Meteorological Table.—Continued.

	JULY.										AUGUST.										SEPTEMBER.									
	Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.	
	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.
San Francisco..	..	..	..	61.2	68.	49.	..	..	..	..	..	..	..	62.1	79.	52.	..	..	..	..	..	..	..	61.6	78.	49.	..	.02	..	..
Niles.....	57.8	75.3	55.3	62.8	88.	50.	..	..	..	..	58.4	79.1	57.1	64.8	94.	50.	..	..	..	..	57.6	77.7	57.3	64.3	100.	48.	..	..	..	..
Livermore	66.4	90.6	70.	79.	111.	54.	..	..	..	..	68.3	95.	70.2	77.9	114.	50.	..	..	..	..	62.5	89.3	65.4	72.4	110.	50.	..	..	..	..
Ellis.....	81.6	94.1	73.8	83.1	108.	60.	..	..	..	..	77.4	94.9	74.	82.1	106.	60.	..	..	..	..	68.4	84.9	66.3	73.2	94.	52.	..	..	..	..
Stockton.....	65.9	87.2	67.4	73 5	96.	56.	..	..	..	..	64.7	91.2	69.3	74.7	104.	58.	..	..	..	..	58.5	88 7	65.	70.7	98.	48.	..	..	..	..
Modesto.....	72.	94.7	71.7	79.5	103.	58.	2	..	..	..	..	..	..	..	..	..	..	..	..	..	63.4	81.6	63.8	70.6	98.	51.	..	..	..	..
Marysville....	72.7	92.1	80.	82.	109.	64.	..	..	..	..	73.6	89.7	88.4	83.9	102.	68.	..	..	..	..	66.3	75.1	75.	72 1	88	60.	..	..	..	..
Chico	71.	96.	80.	82.3	109.	60.	..	..	..	..	68.9	99.	80.8	82.9	109.	62.	..	..	..	..	59.5	86.9	68.2	71.5	98.	45.	..	..	..	..
Tehama.....	79.6	97.2	86.	87.6	109.	60.	..	..	..	..	85.	99.9	88.1	91.	113.	72.	..	..	..	..	73.7	87.1	78.7	79.8	110.	64.	..	..	..	..
Miller's Ranch	74.	104.5	83.7	87.4	118.	60.	..	..	..	..	76.1	103.9	84.8	89.2	115.	63.	..	..	..	..	62.8	93.1	74.9	76.9	103.	52.	..	..	..	..
Sacramento ...	60.3	85.1	68.3	71.2	94.	55.	..	..	..	..	62.8	92.5	72.2	75.8	97.	53.	..	..	..	..	55.2	79.8	65.5	66.8	93.	45.	..	..	..	..
Rocklin.....	74.5	95.8	72.6	81.	111.	60.	..	..	..	..	73.7	99.5	73.1	82.1	110.	59.	..	..	..	..	64.9	90.9	68.5	74.8	102.	56.	..	..	..	..
Auburn.....	72.4	87.	74.4	77.9	96.	58.	..	..	..	..	71.5	84.	76.6	77.4	99.	61.	..	..	..	..	62.	82.7	66 7	70.5	93.	50.	..	..	..	..
Colfax	73.	90.7	72.6	78.7	97.5	54 5	..	..	..	..	74.	91.6	73.1	79.9	101.5	65.	..	..	..	..	62.2	84.7	66.1	71.	94.5	46.5	..	..	..	..
Alta	76.8	..	77.9	..	92.	58.	..	..	..	..	68.2	..	79.6	..	..	58.	..	..	..	..	58.6	76.	67.6	67.4	92.	44.	..	..	..	..
Emigrant Gap..	64.5	80.9	68.6	71.3	90.	53.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cisco.....	54.4	70.3	55.4	60.	80.	50.	..	..	..	..	59.9	81.7	59.4	67.	92.	54.	..	..	..	..	51.2	72.3	51.7	58.4	83.	34.	1	.40	..	..
Summit.....	56.7	71.6	56.3	61.3	83.	41.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52.2	65.3	45.3	54.3	77.	27.	..	..	1	3
Truckee.....	69.8	80.4	69.3	73.1	89.	56.	..	..	..	..	49.9	84.7	66 6	67.1	90.	38.	..	..	..	..	38.4	73.8	50.4	54.2	83.	26.	..	..	1	2
Boca.....	54.2	87.8	68.8	70.3	100.	40.	1	2.	..	..	48.5	88.4	68.5	68.4	100.	30.	..	..	..	..	36.6	80.9	56.6	58.	90.	25.	..	..	..	..
Reno.....	68.7	88.7	68.3	78.5	99.	58.	..	..	..	..	64.	92.4	72.5	76.3	100.	58.	..	..	..	..	50.9	79.8	57.7	62.8	90.	40.	..	..	..	..
Wadsworth...	72.4	90.1	72.	78.1	100.	58.	1	.25	..	..	69.6	91.7	72 3	77.8	100.	60.	..	..	..	..	57.7	80.5	58.5	65.6	92.	42.	..	..	..	..

Meteorological Table.—Continued.

	OCTOBER.										NOVEMBER.										DECEMBER.									
	Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.		Temperature.						Rain.		Snow.	
	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches	7 A. M.	2 P. M.	9 P. M.	Mean.	Max.	Min.	Days.	Inches.	Days.	Inches.
San Francisco..	..	..	..	61.5	79.	45.	..	.13	..	..	..	..	..	56.5	71.	38.	..	2.27	..	..	..	..	..	53.7	64.	38.	..	12.8	..	..
Niles	52.9	76.5	57.5	62.3	94.	44.	1	.05	..	..	47.2	65.3	50.	54.2	86.	34.	8	1.56	..	..	45.5	58.4	50.9	51.6	68.	30.	8	11.9	..	..
Livermore	60.8	83.7	60.6	68.4	109.	49.	2	..	..	..	44.9	63.8	49.3	52.7	80.	37.	4	1.13	..	..	43.1	59.1	46.7	49.6	75.	34.	10	11.7	..	..
Ellis	64.3	79.1	64.1	69.2	92.	52.	..	..	..	..	47.9	64.6	47.	53.2	80.	32.	4	.66	..	..	45.3	55.4	46.5	49.1	62.	30.	11	9.5	..	..
Stockton	49.1	81.2	60.1	63.5	96.	38.	..	..	..	..	41.13	65.5	50.9	52.5	78.	30.	8	.133	..	..	44.9	55.8	47.	49.2	64.	30.	11	11.5	..	..
Modesto	57.8	77.9	61.5	65.7	89.	46.	..	..	..	..	45.1	63.1	47.	49.1	66.	38.	4	.87	..	..	45.5	52.4	49.5	49.1	61.	38	14	4.76	..	..
Marysville	58.	74.6	65.5	66.	86.	50.	1	.09	..	..	50.	60.3	53.	54.5	68.	44.	6	.72	..	..	50.3	54.2	52.5	52.3	60.	42.	14	8.08	..	..
Chico	61.3	75.1	58.	61.5	98.	40.	1	.09	..	..	42.9	62.3	49.6	51.6	78.	30.	5	2.07	..	..	42.8	52.6	46.9	47.4	70.	31.	11	10.11	..	..
Tehama	59.6	73.	70.9	67.8	89.	50.	1	..	..	..	52.9	56.5	54.8	54.7	72.	41.	3	..	..	..	54.1	56.7	55.1	55.3	62.	48.	8	9.03	..	..
Miller's Ranch	56 8	83.	66.5	68.7	102.	44.	..	..	..	..	45.9	65.1	52.7	54.6	84.	35.	4	1.77	..	..	42.8	54.1	46.6	47.8	71.	30.	13	5.17	..	..
Sacramento	51.	79.1	60.5	63.5	90.	40.	..	.29	..	..	41.8	59.7	47.8	49.7	78.	31.5	8	1.23	..	..	44.3	51.9	49.2	47.8	65.	30.	13	10.3	..	..
Rocklin	61.5	81.6	57.	66.8	98.	48.	..	..	..	..	47.1	68 6	47.6	54.4	76.	29.	6	2.11	..	..	44.7	53.6	47.4	48.6	62.	28.	13	8.81	..	..
Auburn	55.3	76.9	62.	64.4	91.	42.	1	.54	..	..	44.1	60.6	48.1	50.9	76.	33.	8	2.80	..	..	41.2	57.1	45.8	48.	62.	30.	16	13.5	..	..
Colfax	55.9	76.5	57.2	63 2	90.	42.	..	..	..	..	44.5	56.5	48.1	49.7	76.5	32.5	10	4.23	..	..	44 6	55.	48.3	49.3	69.5	35.	15	16.1	..	..
Alta	51.2	73.7	58.6	61 2	83.	36.	..	..	..	..	34.5	46.6	41.5	40.9	72.	24.	..	..	..	..	39.6	54.5	46.7	46.9	69.	28.	9	8.8	..	..
Emigrant Gap	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cisco	47.6	61.9	43.7	51 5	78.	32	1	.20	..	..	30.6	40.8	33.2	34.9	59.	19.	1	1.	..	..	29.2	36.	31.	32.1	46.	20.	5	15.9	10	90
Summit	40.2	61.7	39.7	47.2	76.	24.	..	..	1	4	27.1	38.5	28.6	31.4	56.	12.	..	..	..	85	27.6	35.	30.2	30.9	43.	15.	2	10.	14	170
Truckee	29.9	69.4	32.8	44.1	78.	25.	1	.002	..	..	24.4	44.6	29.4	32.8	65.	1.	1	.04	..	..	19.	38.4	23.8	27.1	50.	..	8	10.1	14	31
Boca	31.8	71.8	42.5	48.7	82.	25.	..	..	..	..	25.6	56.9	32.9	38.5	70.	5.	..	..	..	..	22.	46.3	31.4	33.2	70.	..	3	2.5	15	48
Reno	37.7	68.7	45.4	50.6	81.	22.	..	..	..	..	28.5	63.	35.7	39.	70.	10.	..	..	..	..	31.9	45.4	36.4	37.9	54.	10.	5	2.29	1	2
Wadsworth	35.6	63.6	41.2	46.8	80	19.	..	..	..	..	26.4	46.6	30.5	34.5	64.	10.	1	.27	..	..	28.6	41.9	33.9	35.4	58.	10.	5	1.80	..	..

A study of the Table will afford a tolerably fair idea of the climate, in respect of temperature, at least, of the extensive territory which it represents. It exhibits the transition, as we pass from the coast, of which San Francisco is the type, over the coast range of mountains through Livermore Pass, down along the San Joaquin Valley to Stockton, the chief city of this section, through the Sacramento Valley to Sacramento, and up this valley through the important localities of Marysville and Chico to Tehama, until recently the terminus of the California and Oregon Railroad. Again, it shows the contrast presented by these with the climates met with in the Sierra Nevada, and over these as far as Wadsworth in the neighboring State of Nevada. We see, in a general way, the effect of altitude and topographical features, as well as proximity to the ocean, upon the temperature of these different regions, and mark the mean monthly variations which characterized the year. Perhaps a still better idea may be formed of the thermometric range, in the different sections now under review, by the accompanying diagram, in which the mean monthly variations are more prominently exhibited.

The data having reference to the amount of rain and snow are worthy of notice. The variability of our climate in this respect has been observed by those whose attention has been paid to the subject, and has become a topic of ordinary comment. This uncertainty of our seasons, the variation in the amount of aqueous precipitation in different years, is a feature which affects the industrial relations of the State more perhaps than its sanitary. The season of 1870–1 of which January, February, March, and April, 1871, represent the latter half, or a little more, was a remarkably dry one, in which the agricultural interests suffered severely. At San Francisco on the coast, at Sacramento in the valleys, and in the Sierra Nevada Mountains, the rain-fall during the above months (snow in the latter being reduced to rain) was only 9.96, 6.371, and 23.15 inches in these localities respectively. In this year 0.555 inch, included in the above, fell in May, in Sacramento. By other statistics, we find that in the early part of the season, October, November, and December, 1870, there fell 4.59, 1.755, and 10 inches respectively, making a total of 14.55 for San Francisco, 8.126 for Sacramento, and 33.15 for the summit of the mountains. The average rain-fall is 21.50 inches in San Francisco, and 20.06 in Sacramento. For the mountains, the available statistics embrace only a single year, 1871, when it was 60.29 inches. The State is

subject to such variations. In fact our severe winters are periodical. How far the amount of rain may subsequently affect the health of the population is problematical. In Sacramento, before the levees had been erected of adequate strength and height to protect the city from the floods which swept over it at each recurring season of severe rains, it became a common remark among our medical men, that the ensuing summer was unusually healthy, and similar observations were made of the surrounding country. The fact was demonstrated by the writer as true of the summer succeeding the last great flood of 1861–2, in a report made to the authorities on behalf of the Board of Health. There can be no doubt, however, of the immediate influence of the winter rainy months upon the prevalent diseases and the mortality. This is especially shown by the increase in affections of the pulmonary organs and the augmented rate of mortality thereby, an effect due doubtless to the temperature and humidity of that season. We shall have more to say of these diseases hereafter.

The column of maximum temperature, though taken from the 2 P. M. observations, and, therefore, not always the true maximum, shows a high range of the thermometer during the summer months in some localities.

It should be recollected that these observations were taken at the several stations along the routes of the railroads, in localities not always strictly adapted to scientific exactness, and possibly in exposures sometimes liable to error from reflection of heat. Care has been taken by those engaged in the work to insure the utmost possible accuracy, and whatever deviations from the true limit of temperature may have occurred, are due to the unavoidable conditions of exposure to which the instruments were subjected rather than to the neglect or incompetence of the observers. The fact of a temperature as high as that portrayed in the "Table" has indeed been verified by many who have paid special attention to the subject. Thus Dr. Cabanis, resident for many years at Fort Jones, Siskiyou County, near the extreme northern limit of the State, speaks of the not infrequent temperature of 110° Fahr. in proper exposure. It is not improper, therefore, to consider the figures of the "Table," as in the main correct, and they are interesting as illustrating the excessive heat to which the population of certain portions of California are occasionally subjected. From the monthly reports from which the "Table" was prepared, we learn, for example, that at Livermore, in the coast range, the ther-

mometer, in August, rose to 100° during twelve days; 105° or over, during five days; 110° or over, four days. At Rocklin, some fifteen miles from Sacramento, it reached, in the same month, to 100° or over, during sixteen days; 105° or over, six days; 110° or over, three days. At Chico it was noted at 100° or over, fourteen days; 105° or over, three day, and 110° or over, one day. At Tehama, likewise in the valley of the Sacramento, it was reported at 100° or over, eighteen days; 105° or over, seven days; 110° or over, three days.

The fact, that this excessive temperature is endured without suffering, that sunstroke is almost unknown among us, that the evenings are generally cool and refreshing, and the nights often rendered comfortable by blankets, is one of the most interesting features of our summer climate, a feature which, while it is a source of physical comfort, and in some respects a conservator against disease, may also be regarded as the excitant of many of the maladies met with during the hot season.

In our report to the last session of the Association, we referred to the sudden changes in temperature, the thermometric deviations between day and night, as an element in our climate which seemed to render a residence in the valleys objectionable for those suffering from pulmonary affections, especially when taken in connection with the comparatively greater humidity there than in the more elevated districts. Even in the latter, the thermometric range is, as we showed in the report alluded to, quite large, the difference in the effects being mainly due to the relatively greater dryness of the atmosphere. We regret not being able to continue the statistics on this point through another year. It is an important subject for close observation, and bears an intimate relation to the sanitary influence of the State.

The following Table will serve to show the monthly and daily alternations of temperature in several mountain and valley localities.

Table showing the Mean Monthly and Extreme Daily Range of Thermometer in 1871, *as shown by three Daily Observations.*

Locations.	January.		February.		March.		April.		May.		June.		July.		August.		Sept.		October.		November.		December.		
	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	Mean monthly.	Extreme daily.	
Niles	..	..	12.9	24.	15.3	38.	13.	30.	15.3	30.	20.5	32.	20.	34.	22.	34.	20.4	42.	23 6	36.	18.1	34.	12.9	30.	
Livermore	16 2	35.	9.9	24.	14.4	33.	16.2	30.	14 6	40.	18.6	32.	24.2	42.	26.7	44.	26.8	46.	23.1	45.	18.9	40.	16.	34.	
Ellis	10 7	22.	18.7	32.	15.4	30.	14.3	30.	14.8	30.	17.	32.	2o.3	28.	20.9	32.	18.6	32.	15.	34.	17.6	26.	10.1	26.	
Stockton	20.8	38.	19.2	31.	22.2	33.	20.3	32.	17.2	27.	20.5	28.	21.3	29.	26.5	36.	23.2	36.	32.1	45.	24.3	40.	10.9	22.	Valley.
Modesto	..	..	..	..	16.4	31.	..	..	23 4	41.	37.5	38.	23.	33.	..	..	17.8	32.	20.1	24.	10.	14.	6.9	12.	"
Marysville	..	..	14.6	33.	21.4	39.	23.8	34.	28.5	40.	29.	48.	19.4	34.	16.1	22.	8 8	18.	16.6	24.	10.3	14.	3.9	8.	"
Chico	19.7	33.	15.7	27.	8 2	32.	18.2	29.	17.1	31.	22.7	32.	25.	36.	30.1	42.	27.4	41.	23.8	40.	19.4	32.	9.8	38.	"
Tehama	..	..	17.4	28.	14.7	29.	18.5	33.	19.9	26.	20.5	32.	17.6	31.	14 9	25	18.4	21.	13.4	22.	3.6	16.	2.6	6.	"
Miller's	..	..	12.1	23.	6.7	31.	23.9	32.	18.7	33.	31.6	46.	30.5	46.	29.8	37.	30.3	46.	26 2	38.	19.2	34.	11.3	28.	"
Rocklin	22.4	32.	13.4	30.	18 6	30.	13.2	29.	16.1	28.	20.2	30.	23.2	36.	26 4	38.	26.	38.	24.6	34.	21.5	37.	9.9	23.	"
Auburn	16.4	25.	14.2	29.	13.5	24.	14.4	25.	13.4	29.	14.5	26.	14 6	19.	12.5	25.	20 7	26.	21 6	28.	16.4	24.	15.9	23.	Mountain
Colfax	14.	25.	12.7	22.5	12 9	22.5	13.7	21.5	15.	29.	16.3	25.	18.1	22.5	18 5	23.	22.5	26.5	19.3	30.5	12.	24.	10.4	24.	"
Alta	10.3	24.	7.5	28.	..	..	5.5	..	..	..	..	..	..	..	..	..	17.4	30.	22.5	34.	12.1	30.	14.9	24.	"
Emigrant Gap	9.4	..	5.5	12.	9.4	18	9.8	22.	11.8	25.	12.2	21.	16.4	29.	..	..	..	..	..	..	..	..	..	..	"
Cisco	9.4	21.	12.5	20.	8 5	17.	9.7	24.	10 4	24.	..	..	15.9	21.	22 3	32.	21.1	30.	18.2	29	10.2	23.	6.8	19.	"
Summit	11.	23.	10.3	27.	12	25.5	14.4	32.	..	..	19.4	29.5	15.3	28.5	..	..	20.	32.	22.	33.	11.4	26.	7.4	27.	"
Truckee	24.5	37.	22.3	42.	16 6	32.	13.3	32.	29.6	36.	25.	34.	11.1	17.	34.8	42.	35.4	50.	39.5	48.	20.2	39.	19.4	48.	"
Boca	30.2	50.	32.4	58.	23 9	48.	28.	45.	25.2	50.	36.5	48.	33.6	50.	39.9	60.	44.3	60.	40.	55.	31.3	60.	24.3	52.	"
Reno	21.6	34.	19 3	36.	18.7	34.	17.5	26.	17.2	33.	22.	26.	20.4	29.	28.	36.	28.9	46.	31.	54.	24.5	40.	13.5	30.	"
Wadsworth	23.9	44.	21.9	38.	2.2	38.	16.7	34.	18.3	38.	17.9	26.	18.1	27.	22.1	38.	22.8	32.	28.	46.	20.2	40.	13.3	30.	"
Sacramento	..	26.	..	23.	..	26.	..	28.	..	..	21.8	37.	24.8	33.	29.7	36.	24.6	34.	28.1	35.5	17.9	32.5	7.6	23.	Eastern slope.

It is worth while to notice the rapid increase in the range of the mercury after crossing the summit of the mountains, along their eastern slope, as at Truckee, Boca, and Reno.

It is not always easy to say what particular influence, or how much, the climate of a place may have in the production of disease, yet there can be no doubt that, with us, a not inconsiderable share is due to the climatic feature under consideration. The surprise has been that it is not greater than it actually is. Our atmosphere, everywhere, is essentially a *dry* one. The northerly winds are proverbially so; and during the summer season at least, it is only in localities affected by the southerly winds which come in upon us bearing upon their bosom the vapors which proceed from the ocean, that very marked results are observable. This is true to some extent as far inland as Sacramento. Beyond, as at Marysville, Chico, and Tehama, these winds are not much felt. The atmosphere is, consequently, more dry, and bronchial affections, sufficiently common in the more southern section of the valley, are less markedly observable.

The same may be said, with yet stronger emphasis, of the mountain regions. There, the element of atmospheric humidity is still less noticeable, and though the thermometric range is in some localities quite large—a mean of 19°.7 for the three summer months—the usual morbific effects are almost entirely absent. These are facts within the knowledge of almost every medical man familiar with the two localities in question, and we think it legitimate to ascribe the difference in the physical effects to the relatively greater humidity of the one over the other, in connection with difference in the range of temperature.

We have characterized the atmospheric condition as being essentially dry: and to this fact is to be attributed the endurance of the excessive heat of some of our summer months, not only without positive debilitation, but even without much discomfort. To the same cause we ascribe the absence (almost total) of sunstroke. Indeed, so rare is the latter, that during a residence of twenty years in the valley, the writer has encountered not more than three well-marked cases.

The following table and diagram will serve to illustrate the contrast between the valley and mountain climates in respect of humidity—Sacramento being the exponent of the former, and the summit of the Sierras of the other.

THERMOMETRI

VA

JAN. FEB. MAR. APL. M

95°

90

[1] Snow being reduced to rain.

THE END.

Hygrometric Table for Sacramento, 1871, *and Summit*, 1870.

	January.			February.			March.		
	D. B.	W. B.	Rain.[1]	D. B.	W. B.	Rain.	D. B.	W. B.	Rain.
Sacramento.	44°.9	41°.6	1.951	42°.3	39°.3	1.840	54°.1	49°.2	0.980
Summit.	28.9			25.8	23.9	9.60	25.7	23.	0.730

	April.			May.			June.		
	D. B.	W. B.	Rain.	D. B.	W. B.	Rain.	D. B.	W. B.	Rain.
Sacramento.	55°.9	49°.	1.045	60°.5	53°.9	0.555	71°.4	59°.	None
Summit.	38.	33.1	4.	46.6	39.7	1.	53.6	43.1	Sp'kle

	July.			August.			September.		
	D. B.	W. B.	Rain.	D. B.	W. B	Rain.	D. B.	W. B.	Rain.
Sacramento.	71°.2	61°.3	None	73°.4	61°.8	None	66°.8	60°.1	None
Summit.	61.7	46.8	Sp'kle	64.4	50.7	None	54.3	42.8	None

	October.			November.			December.		
	D. B.	W. B.	Rain.	D. B.	W. B.	Rain.	D. B.	W. B.	Rain.
Sacramento.	59°.3	50°.6	0.290	49°.7	44°.3	1.235	49°.8	41°.	10.365
Summit.	46.3	35.5	2.400	36.7	34.8	2.900	33.3	31.	4.700

We proceed to speak of some of the special relations of the climate with disease, and in doing so will endeavor to represent briefly, such peculiarities or features of interest which observation has pointed out to us. Among these, none deserve a more prominent place than the

CONSERVATIVE INFLUENCE OF THE CLIMATE.—It is a feature about which too little has been said by those who have attempted to interpret the character of our climate, and upon which the physician is accustomed to rely with trusting confidence in the treatment of disease. To the surgeon it is invaluable. It comes to his aid in many of the most difficult and trying emergencies which he is called upon to meet, and encourages him to attempt the preservation of the integrity of injured members, even against

[1] Snow being reduced to rain.

the weight of authority, and the precepts of the books, and enters as an important element for consideration when doubtful as to the probability of success. It is the foundation of many of the surgical triumphs which the profession here have achieved, and often renders justifiable a boldness in action, which under other circumstances might be considered rashness. Nowhere, probably, do patients recover more speedily from injuries than here, and in no other country are operations of difficulty, involving extensive mutilation or excessive loss of tissue, and necessitating its restoration by the effort of Nature, more successful. So far as we are aware, this conservative element of the climate is not confined to any special locality. It is referred to by surgeons from every portion of the State. Dr. Cabanis, writing from Fort Jones, in the northern mountains, alludes to it as the basis of his success in many capital operations, which, otherwise, it would have been unjustifiable to attempt. He remarks, further, that he has "never known erysipelas to attack a wound" there, nor has he seen but "one case of traumatic tetanus."

Malarial Fevers.—To these diseases allusion has been made in previous reports to the Association, especially in respect to their relation to locality and the topographical peculiarities of different portions of the State. No other class of diseases with which we are brought into contact is of so universal prevalence. Yet there are differences observable in different localities, such as would be expected from diversity of soil, vegetation, and altitude. In the valleys, especially in the great plains of the Sacramento and San Joaquin, as is well known, these complaints especially prevail, the miasmatic influence pervading and modifying almost every form and variety of disease, yet even as far south as Los Angeles and San Diego, they are said by physicians resident there to be of frequent occurrence. The universal testimony of medical observers is that they are seldom severe, and readily yield to appropriate treatment. In the fall of the year, and early winter, they are more liable to assume a slow and typhoid type—constituting the typho-malarial fever. The true typhoid fever is also occasionally met with. The same varieties of fever are likewise common in many of the mountain localities, wherever, indeed, the miner has penetrated and ditches have been dug for conveying water for mining purposes; along the bed of streams, and in low wet locations even in high elevations. We have seen them even as far up as the

summit of the mountains—in moist situations—a true intermittent fever, arising apparently from the surface moisture around the reservoirs built for the collection of water for the formation of ice during the ensuing winter. There is also in the mountains a type of fever to which we in the valleys are not so subject—familiarly known as mountain fever. Those who have treated it there regard it as a form of remittent fever, tending early to a typhoid condition unless promptly arrested by large and effective doses of quinine.

During the past year, we have been unusually exempt from this entire class of diseases, even in situations, as along the Sacramento River, most liable in ordinary seasons. Such as have occurred have been less prone, also, to assume a typhoid character. In Sacramento City, including the inmates of the County Hospital only ten deaths are reported from this cause, of which nine occurred in August, September, October, and November.

From San Francisco, we have an interesting review of the diseases of the year from the pen of Dr. Gibbons, Jr. Typhoid fever has been set down as guilty of one hundred and eleven deaths, and to typhus are due *two*. The latter—true typhus—we have never met with in Sacramento, and are disposed to doubt its very frequent occurrence in any section of the State.

The only valley localities within our knowledge presenting a uniform exemption from intermittents, is a portion of Petaluma Valley, in Sonoma County. Dr. Graves reports not having seen a case of "ague" during his residence there, except in persons just from other localities, bringing the disease with them; and Dr. W. R. Cluness, now of Sacramento, but for some years in active practice there, adds his testimony to the same effect. The fact is an interesting one, and we are pleased to find the statement of these two physicians confirmed by Dr. Carpenter now residing in Petaluma. For the treatment of the entire class of malarial fevers, quinine is the only reliable remedy. Judiciously given, it is unexceptionally effective. It has proved itself true in almost every emergency, and will outlive, in the estimation of the profession, all the substitutes which have been proposed.

ERYSIPELAS.—As an epidemic, this disease has not often presented itself in our valley sections of the State, though cases have frequently occurred sporadically. There have been only two exceptions within our knowledge. First in 1862, soon after the

great flood, when the condition of the atmosphere seemed to be peculiarly favorable to its development, particularly in its traumatic form, cases occurring after the most trivial wounds, and even as a result of vaccination. Variola was epidemic at the same time. Again, during the past year, a large number of cases presented themselves, the disease assuming for a time the proportions of an epidemic. In the latter, it appeared to attack, by preference, the head, attended by a fever of a low typhoid character. Occasionally there was violent delirium, and death by meningitis. Three fatal cases were reported—though other deaths from the same cause occurred in the vicinity of the city—all but one of the fatal cases were among adults. In the treatment, iron in the form of the tincture of the chloride, quinine, and when the powers of the system seemed to give way, alcoholic stimulants, were found to be most successful. As topical applications, the tinct. iodine, and solution of sulphate of iron, as advised by Velpeau, were used more frequently than anything else. In other cases, the expressed juice of cranberries was tried, as much, perhaps in obedience to popular prejudice in its favor as for any specific virtue it was supposed to possess.

In years past, erysipelas was a disease of common occurrence in certain portions of the mountains. In and about Nevada, one of the northeastern counties of the State, it formerly prevailed epidemically—attacking, it is said, principally the mining population.

ENTOZOA.—My observation teaches me that Californians are remarkably exempt from at least one species of these parasitic animals—that species so commonly observed among children in the Atlantic States—the round worm or *Ascaris lumbricoides*. A somewhat active practice of twenty years in the locality of Sacramento has brought to my direct notice but two or three such cases—I have frequently heard it suggested by mothers and grandmothers, that their little ones "*must* have worms—they have all the symptoms;" in many cases vermifuges of different kinds had already been administered, without result, except an aggravation of the symptoms.

Treatment directed to the condition of the system, which has been generally that associated with irregular intermittent fever, with more or less gastric irritation, has usually relieved the child and dispelled the delusion. In only two cases has this variety of entozoa been seen by the writer in this locality, and other physicians here concur in the opinion of their infrequency.

Other species are more common. The *Oxyurides* prevail extensively in both children and adults, the greater proportion of the cases being among the former.

The Tapeworm (*Tænia solium*) is also common, more common, it is believed, than in some other States. It may not be out of place here to mention the remedy, which, after having made trial of many others, has seemed most effective for their expulsion. The formula usually employed is the following:—

℞.—Olei filicis maris,
Pulv. kameelæ, ää ʒij.
Chloroform. gtt. xv–xx.
Mucil. acaciæ, fʒij. M.

To be taken in the morning fasting.

It is seldom that any subsequent medication is required, the "head" of the parasite passing with its body. In delicate individuals, the prescription is directed to be taken in two doses. The same combination has been used extensively by other physicians, to one of whom I am indebted for the suggestion.

PERTUSSIS.—Without, until very recently, assuming an epidemic form, hooping-cough prevailed in certain portions of the State, during the early part of the winter. In Sacramento, occasional cases were noticed during the fall months, the number increasing as the winter progressed, until in January and February, 1872, they became somewhat general among young children. It has not been confined to any one locality, but has been observed in all portions of the city. At this time too, March, 1872, associated with hooping-cough, bronchial catarrh and influenza have sensibly augmented in frequency and severity. Up to the present time, the disease, except when combined with severe pulmonary symptoms, has assumed a mild form, no deaths having been reported. Experience, during the present season, has seemed to demonstrate the efficacy of quinine in liberal doses.

VARIOLA.—Within the twelve months, ending January 1, 1872, the State was generally exempt from this disease. While some of the principal cities of the Eastern States were experiencing its visitation with fearful violence, it is somewhat strange that, through the different channels of communication, it should have failed to reach the cities of California. Perhaps its epidemic force was expended here two years ago. A few cases, indeed, were reported in San Francisco, and two deaths in July; but it has nowhere

shown a tendency to diffuse itself. Of the cases in San Francisco, Dr. Gibbons, Sr., reports to the State Medical Society: "A few cases of smallpox have been reported to the Board of Health, from time to time, and two deaths from this cause are on record. It is questionable whether most cases thus reported were not varicella in an aggravated form. Varicella has prevailed for several months, both in San Francisco and in some interior localities, presenting in numerous instances features not distinguishable from modified smallpox. One of the cases of reported smallpox above referred to, occurring in a neighborhood where I was cognizant of the prevalence of varicella, I was induced to inspect it; and I am satisfied that it was nothing more than varicella. In another instance, four cases of smallpox were reported in one house. On examination, I found five cases of eruptive disease, four of which were decidedly chicken-pox. The fifth, had it stood alone, would have been pronounced varioloid, but under the circumstances I could not avoid classing it with the others." It may be remarked, in passing, that cases of varicella similar to the above, and assuming a form so severe as to be readily mistaken for modified smallpox upon superficial examination, have been occasionally observed in Sacramento. Indeed, anomalies in the appearance of the exanthematous and eruptive diseases are among the noticeable features in the medical history of California. Later in the year, variola was said to be prevalent in portions of Oregon.

Since the first of January, 1872, a few cases of genuine and unmistakable variola have occurred. On the second of that month, the steamer Constitution arrived from Panama, one case of smallpox having died on the journey up, two days previously. The nurses in whose charge the case had been placed were removed to the smallpox hospital, the disease subsequently appearing in one of them, the father of the deceased. No deaths were reported, nor did the disease spread. About the same time a few cases were discovered in the northern portion of the valley, at or near Tehama, on the line of the California and Oregon Railroad. They were said to have been imported "by rail" from the Atlantic States. A little later, five cases were reported in a family of immigrants at Rocklin, fourteen miles distant from Sacramento; also one case in the town of Washington, immediately opposite Sacramento; and more recently still (March), one case in the city itself, brought there from Nevada, where the disease has been raging with a fatality peculiar to its most virulent epidemic forms. It is not

probable that we shall be much annoyed by this unwelcome visitor in California at this season. The atmospheric constitution seems to be, just now, unfavorable to its diffusion.

RHEUMATISM.—In the valley divisions of California and along the coast, rheumatism is a disease of common occurrence. It is encountered in all its ordinary forms, and, in the chronic state, as in myalgia, is so associated with neuralgia as to render it sometimes difficult to determine which predominates. Probably none of the diseases met with in the State more frequently require the attention of the physician than this, if we except malarial fever. Even as far south as San Diego, it is reported to be "indigenous." Occurring along the coast and in the interior valleys, it is probably to be ascribed to humidity, and, in summer, to the effect of the rapid transitions of temperature upon persons unprotected by suitable clothing. Flannel worn next the skin has been found a valuable safeguard. Attacks are more common, however, in winter during the rainy season. Cardiac complications are not infrequently met with, and this may, in part, explain what is believed to be true, the proportionately greater frequency of heart disease in California than in many other countries.

The residents in the mountains seem to be less liable to rheumatic attacks. Dr. Cabanis, writing from Siskiyou, says that it is rarely met with, and the reports of other reliable medical gentlemen from different mountain sections seem to confirm the fact of its relative infrequency there as compared with the valleys and the coast. This immunity is doubtless due to the different hygrometric and thermometric condition of the atmosphere.

In Sacramento, the records for 1871 show only three deaths due to rheumatism—another confirmation of the truth that records of mortality are not always a fair exponent of the prevalence of disease. By heart disease, including aneurisms, we have a report of 17 deaths. In San Francisco, the record shows 115, the average for the five preceding years being 131.4.

DIGESTIVE SYSTEM.—To the vicissitudes of temperature to which the summer climates of a large portion of California are subject, the extreme heat of mid-day, and the somewhat rapid transition to a cool and often humid atmosphere, may be chiefly attributed the derangements of the digestive system to which the population are subject. This is especially true of those valley

locations within the range of the ocean winds. In early days, when society was yet in its forming state, unsettled, improvident, often reckless of health, and disregardful of all hygienic precautions, diarrhœa, often obstinate in its character, was one of the most common diseases with which the profession were brought into contact. Then it often assumed a chronic form, intractable and exhausting, and served, more than any other form of disease, to swell up our bills of mortality. The increase of population, the gradual introduction of families, and, consequently, a better regulated condition of society, the general settling down into more judicious habits of life, and the closer observance of hygienic rules, have served, of late years, to ameliorate the sanitary condition of the State, and to bring it more and more into its true relations with its proper climatic influences. In no respect has this been more forcibly shown than in the history of the class of diseases under consideration.

In Sacramento, for five years, from 1851 to 1856 (1852, the year of the cholera, being excluded), the mortality from diarrhœa and dysentery was 258; for the half decade ending with December, 1871, it was only 59, and this, too, with a permanent population increased from 14,000 to 20,000, and notwithstanding the very large accession to our juvenile population which every year has made.

The following "Table" exhibits the total mortality from this entire class of diseases, including diarrhœa and dysentery, in several valley and mountain towns during 1871. It should be remarked that the table embraces also the inflammatory diseases of the digestive system.

Table of Deaths by Diseases of the Digestive System, including Diarrhœa and Dysentery, 1871.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
San Francisco . .	9	7	7	7	17	11	20	19	35	52	14	20
Sacramento . .	2	1	0	0	5	7	0	0	3	4	0	0
Stockton . . .	0	2	0	2	4	7	1	1	5	...	1	1
Marysville . . .	0	0	0	0	1	0	1	0	0	2	1	0
Placerville . . .	0	0	0	0	0	0	1	0	0	0	1	0
Auburn	...	...	0	...	...	...	...	0	0	...	0	2
San Diego . . .	0	0	0	0	0	0	0	2	0	5	1	0
Los Angeles . .	0	1	0	0	0	2	2	2	0	2	1	0
Nevada City . .	0	0	0	0	1	...	0	...	0			
Truckee	0	0	0	0	0	0	2	1	0	...	0	0
Monterey . . .	0	0	0	0	0	0	0	0				

The statistics for the above are taken from the printed reports of the Secretary of the State Board of Health.

We find a total of 298 deaths in eleven cities and towns, representing an aggregate of not far from 225,000 inhabitants, or one in 75.5 of the population. We observe a notable diminution in the mortality as we recede from the coast and the sweep of the coast winds. We may also recognize the comparative immunity of the mountain localities of Truckee, Nevada City, Auburn, and Placerville.

PULMONARY AFFECTIONS.—No class of diseases, which, in a review of this kind we are called upon to consider, possesses a greater degree of interest than those which relate to the pulmonary organs; and, if under this general head we include consumption, the consideration of the relation of climate to these affections may justly be regarded as one of the most important inquiries of which the subject admits. Whether we regard their frequency, their fatality, or their universality, they form a topic of absorbing interest, and the extent to which they are influenced by the atmospheric or other conditions of climate in any given locality, elicits the most anxious solicitude, and is pre-eminently entitled to investigation.

In our last report, 1870, we took occasion to refer briefly to this subject, and to advance such views and opinions relative thereto as a somewhat intimate acquaintance with the climate seemed to warrant. No one at all familiar with the climatological history and features of California can have failed to observe the difference existing between the mountains and valleys in their relation to diseases of the pulmonary system. Several causes concur in this result. These have been cursorily alluded to in the preceding pages.

1st. The greater thermometric range in the valleys than in the mountains. 2d. The excess of humidity of the former over the latter. 3d. The relatively greater atmospheric purity, as it regards malarial diffusion in the mountains; and to these might be added the effect of altitude and its more bracing and invigorating influences.

The first of these conditions has been perhaps sufficiently demonstrated in the meteorological statistics already given, and which it will be unnecessary to repeat.

The second we endeavored to illustrate in our last report for the

two localities of Sacramento and "Summit," these being considered fair exponents of the difference in this respect between the two extremes—the one a type of the valleys, and the other of the mountains.

The Diagram previously given will yet further illustrate the distinction referred to. It is an important element in our climate, which, taken in connection with the daily alternations of temperature, exerts a special influence over the class of diseases under consideration, and which, in localities subject to the range of the coast winds, becomes a prominent exciting cause of disease.

Accurate statistical tables exhibiting the relative mortality from pulmonary affections in these two sections of the State are not available. The fact referred to, however, is within the knowledge of every one at all conversant with the subject, and is in accordance with the united testimony of our medical authorities. Perhaps the following Table, embracing a few localities, compiled from the records of the State Board of Health, will not be without interest in this connection.

Mortality by Diseases of Pulmonary Organs, including Phthisis, during 1871.

Places.	Jan.		Feb.		Mar.		Apr.		May		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.	
	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.	Consumption.	Inf. lungs.
San Francisco,	62	17	41	22	39	13	54	13	38	6	39	9	32	6	41	11	45	3	42	12	37	16	38	8
Sacramento,	2	2	2	5	4	5	7	0	7	0	5	1	2	1	1	1	4	1	5	1	9	4	2	2
Stockton,	1	6	1	0	2	2	1	1	1	1	3	2	1	0	2	1	0	0	..	..	2	0	3	2
Marysville,	2	3	3	3	2	3	1	1	1	1	0	0	1	1	0	0	0	0	2	1	6	1	3	1
Placerville,	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Auburn,	..	..	..	..	2	0	..	..	..	..	..	..	..	..	0	0	0	0	..	..	0	0	2	0
Los Angeles,	3	0	0	1	5	1	1	1	1	1	3	1	2	2	4	1	3	3	2	1	3	3	5	3
Nevada City,	0	1	0	1	1	0	0	0	0	0	..	..	1	0	..	..	0	0						
Truckee,	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	..	..	1	0	1	0
Monterey,	1	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	1	0						
San Diego,	3	0	4	1	2	1	0	0	0	0	2	0	0	0	2	0	1	0	1	0	1	0	2	0

Let us take for example the locality of Nevada City, in the mountains and Stockton in the valley. The census gives us a population of 10,033 in the latter, and that of the other is set down at 5500. Upon this basis, we have the ratio of mortality as 1 in 304 of the population in Stockton, and 1 in 1375 in Nevada. A contrast as striking might be shown between Sacramento and Auburn, the population being about 20,000 and 2500 respectively, and the ratio of deaths to population, as one in 274 for the one,

and 625 for the other. Taking the statistics for Sacramento alone, and separating the year into two seasons—rainy and dry—the former including the months of January, February, March, October, November, and December, and the latter embracing the remainder of the year, we find that during the rainy seasons there were 48 deaths for this class of diseases, and in the dry months, 30. Perhaps sufficient has been said, however, to demonstrate the correctness of the position assumed—that of the influence of locality, with special reference to humidity and temperature, upon the class of diseases under consideration.

We have already spoken of the malarial fevers to which a very large portion of California is subject, and referred to the very few exceptional localities which seemed to be exempt from miasmatic forms of disease. The debilitating effects of malaria upon the system render it peculiarly amenable to the influences to which we have referred, and thus become a powerful predisponent to pulmonary disease.

In no class of cases is this more forcibly shown than in persons with what is commonly called weak lungs, suffering under chronic inflammatory affections of these organs, or presenting the physical signs of incipient tuberculosis. For such individuals, broken down in strength, with nervous energies weakened, and the circulation poisoned by continual exposure to malarial emanations, we know of no more efficient adjunct to medical treatment then a change of residence to the mountains. The pure, dry air, the invigorating climate, and the indulgence in healthful exercise to which the invalid is continually invited, concur in giving new tone to the system, in stimulating the secretions, promoting appetite and digestion, and improving the circulation.

In our report to the Association at its last session, we referred especially to what we conceived to be the sanitary influence of the mountains, or at least of certain localities therein, upon the progress of tubercular phthisis. In our comments upon the advantages of these portions of the State as a summer residence for the invalid, we alluded to cases presenting the earlier symptoms of disease, to those yet in the incipient stage, when, if ever, the progress of the malady may, by judicious treatment, be stayed. Many come here, as to all other localities supposed to possess advantages for the valetudinarian, manifesting the signs of more confirmed disease, and in many of whom destructive organic changes are already far advanced. To these, although they may for a time be benefited

by the change, our remarks have not applied. But to the very large class of invalids predisposed to "lung trouble," in whom the earlier symptoms of disease are manifesting themselves, who are not already too much weakened to endure the fatigue and self-denials incident to a mountain life, who are able to live in the open air, to exercise freely, to roam the hills in hunting and fishing—for these, we repeat our conviction of the decidedly salutary influences attending a residence in some of our mountain localities. For such, we have observed nothing objectionable in altitude itself—nor have we noticed that such patients, except at great elevations, were more subject to hæmoptysis there than elsewhere. It has seemed that below an elevation of four or five thousand feet, no inconvenience has been experienced by those with whom we have been brought in contact.

The effect of elevation of the rarefied air of the mountains in promoting expansion of the lungs has been remarked by many observers, and there are reasons for believing that in very many cases of disease the low temperature of these regions, associated as it is with atmospheric dryness, is far more favorable than the warmer and more humid climates of less elevated localities. The advantage, too, which we regard as among the most essential, of open air exercise—of open air life—and the inducements presented thereto in the mountains, should not be overlooked. We are speaking, we again repeat, of those cases which present only a predisposition to or are in the early stages of disease, and for these the effect of altitude, with its attendant atmospheric conditions, upon the circulation, digestion, the secretions and nutrition, appears to be decidedly beneficial.

The statistics of mortality by consumption given in the preceding Table can scarcely be relied upon as a true index of the climatic influences in the several localities in which they have occurred. The sanitary reputation of a place, the popular idea of its desirability as a residence for the invalid, makes it a resort for those in supposed need of change of air; they gather together from all sections of the State, and from remote parts of the country, often in the last stages of the malady, clinging to the forlorn hope that what has been of benefit to others may do good to them, and, being past relief, help to swell up the lists of mortality. Such has been the case especially in Santa Barbara and Los Angeles, where the deaths by phthisis were 13 (for eight months, May to December) and 39 respectively. Of the latter locality, Dr. Widney (*Pacific*

Medical and Surgical Journal) says: "I think it is the unanimous testimony of physicians here, that for persons in the early stages of disease, or with simply a tendency to it, the climate is well suited. . . . . But, for persons in an advanced stage, the lungs much affected, it is different. For such, the climate does not seem sufficiently bracing." . . . . He adds, "With regard to the effect of the climate in originating or developing the disease, it is the testimony of Dr. Griffin, after twenty years' active practice in the country, that among the native born population the per cent. of cases is very small indeed, much below the average of the Eastern States, or the upper portions of the Pacific Coast." The latter fact is, if true, one of interest, as indicating the effect of climate upon those born and reared under its influences.

The same objection prevails against the statistics from the mountain localities—it being the unanimous testimony of physicians resident there, that few die of phthisis except those resorting thither, already wasted with the advanced stages of the disease. Dr. Cabanis, to whose communication we have more than once referred, says of Siskiyou County on the borders of Oregon: "During a residence of fourteen years in this portion of the State, I have never seen but two cases of tubercular consumption. These did not originate here. Ten cases of croup would cover all which I have witnessed. I cannot recall to my mind more than ten cases of pneumonia. When it is considered that the population of this county are miners and farmers, who are greatly exposed to bad weather, and have to endure great hardships, it is a matter of surprise that so few cases of disease of the lungs are known here." As a preservative influence the Dr. considers the primitive manner in which the people live—in houses "much open," and using "chimneys in the place of stoves"—to be worthy of consideration. He also refers especially to the facts that, in that county, the patient can "choose the altitude best suited to his breathing apparatus, within a few hours; that there are never extremes of heat and cold; that the water is pure, and the air is never impregnated with malaria, except in certain limited localities."

The State is too young as yet to enable us to form an accurate and reliable judgment as to its true relation to phthisis. The population born here of white parents, or imported here in early youth, have not yet generally reached the age when they would be likely to present the symptoms of tubercular consumption, and of those who have fallen victims to the disease, we have only in a very few

instances sufficient information of their previous history to enable us to form a satisfactory opinion as to the effect of climate. Moreover, the localities from which we have the most complete returns, such as San Francisco and Sacramento, are not such as should be taken as the exponents of the relation between the climate of California and the particular disease under consideration.

From the mountains, where few cases of the disease occur, and which we regard as presenting in some of their subdivisions the most favorable conditions for the invalid, we have no regular and complete mortuary reports. In Sacramento for the three years ending with December, 1871, we have a record of 198 deaths by consumption, viz: under 20 years of age, 14, of whom *three* were Indians, and *five* native whites; from 20 to 25 years, 16; from 25 to 30 years, 23; from 30 to 35 years, 29; from 35 to 40 years, 30; from 40 to 45 years, 20; 45 years and over, 56. Of the whole number, 45 were Mongolians, 67 foreigners from other countries; and 4 of negro extraction. Of those under 20 years of age, 3 were under five. Thus, of the total mortality in Sacramento by this disease for three years, there were only eight natives of the State, and, of these, three were domesticated Indians, and three under five years of age, too small a proportion to serve as a basis for speculation, and yet, if we exclude the Indians, who, when domesticated, and caused to adopt the habits of civilized life, almost universally became tuberculous, reflecting favorably even upon the climatic influences of Sacramento.

This is not the portion of the State, however, to which the consumptive should resort for the benefit of his health. The greater daily thermometric range here than in the mountains, the more sudden and abrupt alternations in temperature, the relatively greater humidity of the atmosphere, and the presence of malaria with its debilitating effects, combine to render the valley climates less suitable than those of greater altitude, of somewhat more equable temperature, of drier and more invigorating atmosphere, and where malaria, if present at all, is only so in modified form, and to a very limited extent.

It is somewhat remarkable that so large a proportion of the victims of phthisis should have been of foreign birth. Of the entire number during the three years, more than five-ninths were foreigners, if we include the Chinese; or, excluding these, nearly one-third. Dr. Gibbons has noticed the same thing as true of San Francisco, and, both here and there, the deaths among the natives

of Ireland largely exceeded those of any other nationality, a fact which the Professor sarcastically remarks cannot be in consequence of the abstinence from whiskey! Perhaps the interesting theory of climatic adaptation "may, in part, explain the circumstance, more especially when considered in connection with the very small proportion of deaths among the native-born whites.

In concluding what we have to say upon the subject of the diseases of the pulmonary organs, it will be proper to remark, as serving to illustrate what we have advanced in reference to the influence of conditions of temperature and humidity in favoring their development, that, at the present time, March, 1872, during a season of more than ordinary humidity, we are experiencing a well-marked epidemic of pneumonia.

DIPHTHERIA.—This disease has not occurred as an epidemic in the vicinity of Sacramento for several years, though cases are frequently met with occurring sporadically. Its mortality here for 1871 was *three*, viz.: in January, 1; August, 1; and November, 1. For San Francisco, Dr. Gibbons reports twenty-three deaths, the greatest mortality in any one month being, in January and April, 4 each. As a general rule, it prevails by preference in the spring and winter months, though the summer season has not been exempt. For several years past, the disease, with occasional sad exceptions, has been mild and amenable to treatment by iron, quinine, and stimulants.

In the mountains, diphtheria is reported generally to present a more aggravated form.

SCARLATINA.—Scarlatina, also, has touched us lightly during the past year. For a short time during the spring and early summer months it was more or less prevalent in Sacramento, but usually of a mild type. Later in the fall, occasional cases were likewise observed. The deaths reported were *eight*, viz.: January, 1; March, 1; April, 1; May, 3; and December, 2. Some of the worst cases met with by the writer were in December, 1871, and January, 1872, imported from Chicago by the railroad. In other portions of the State, it seems to have been equally mild. For San Francisco we have a report of only eighteen deaths, and from five other towns and cities only *two*.

Perhaps we cannot conclude what we have to say upon the sanitary aspects of our climate and the diseases which have pre-

vailed during the last year, without giving a brief abstract of the cases of disease treated in the two hospitals of this city—the County Hospital, and that connected with and controlled by the Central Pacific Railroad Company. The latter, it may be well to remark, has been established by the railroad company for the benefit of their employés, and is supported by a small monthly assessment levied upon each. It is open to all connected with the road in any of its divisions, and consequently embraces patients from various portions of the State, and as far east as Ogden in Utah Territory. From Dr. Nixon, the present medical superintendent and surgeon, we have obtained the following, viz.: intermittent fevers treated at hospital and at the homes of employés, 618, deaths, none; typhoid fever, 4 cases, 1 death; bilious fever, 53 cases, deaths, none; congestive fever, 6 cases, deaths, none; continued fever, 20 cases, deaths, none. Two-thirds of the cases of intermittent fever occurred from June to November inclusive. In addition to the above, there were of erysipelas 9 cases, no deaths; rheumatism, chronic, 30 cases, acute, 10 cases, no deaths; pneumonia, 32 cases, and pleuro-pneumonia, 8 cases, no deaths; consumption, 5 cases, 4 deaths, and 1 removed. The deaths by consumption have been included in the table of mortality above given.

From the County Hospital, Dr. Donaldson, its superintendent, has furnished the following statement: Consumption, 1871, 36 cases; died, 17; relieved and sent to friends, 15; remaining under treatment, 4: erysipelas, 4 cases; died, 1; recovered, 3: pneumonia, 8 cases; died, 5; recovered, 1; relieved and left the hospital, 1; under treatment, 1. It is right to remark, that the cases treated in this hospital are those occurring among the poor of the county, who resort thither only from necessity, and often after having lingered at their ill-provided homes until remedial measures are unavailing. Of the fatal cases by pneumonia above reported, one had organic hepatic disease, and two suffered from Bright's disease of the kidneys. Of intermittent fever, 35 cases are reported, all of whom recovered.

Intimately associated with the climate and sanitary influences of California, are its mineral springs. These are many, of various composition, and differing greatly in therapeutical value. Some of them already have acquired a local reputation for the relief of certain chronic diseases; and others are just now presenting their claims for their supposed medicinal virtues.

The difficulty with these springs, as with every other remedy

introduced into popular favor, and made available to popular use without medical sanction or advice, is that they are resorted to without judgment, and, frequently, under circumstances to which they are entirely inapplicable. It is only by their adaptation to proper cases of disease, by bearing in mind the different composition of the waters of different localities, and by making a selection suited to the peculiarities of each case, that anything like a just estimate of their value can be arrived at. Fortunately some such tests have been made—sufficient to establish the medicinal value of at least a few of the mineral springs of the State.

To some of these it has been thought proper to allude, as coming within the general scope of this report, and as being of practical interest to the profession.

THE "PASO ROBLES" SPRING.

Located in San Luis Obispo County, within about twenty-four hours' ride of San Francisco, these springs have acquired a reputation above almost any others in the State. The climate of the valley (upper Salinas) is said to be pleasant and healthful, and the situation of the springs and their surroundings attractive to the visitor. The water is rich in bicarbonate of soda and the chloride of sodium, and contains a liberal quantity of sulphate of soda. The temperature of the different springs is said to vary from 110° to 140° Fahr. When largely used, they are purgative and diaphoretic and actively diuretic.

The only analysis obtainable exhibits their composition, in one imperial gallon, as follows:—

Free carbonic acid	10.50
Sulphate of lime	3.21
Sulphate of potassa	.88
Sulphate of soda	7.85
Protoxide of iron	.36
Alumina	.22
Silica	.44
Bicarbonate of magnesia	.92
Bicarbonate of soda	50 74
Chloride of sodium	27.18
Iodides and bromides	traces
Organic matter	1.64
Solid contents	93.44

The water contains a large amount of sulphuretted hydrogen—it is stated almost to saturation.

The main spring is said to discharge 100,000 gallons in twenty-four hours.

In addition to the springs proper, there are, in connection with them, "Mud Springs," at a temperature of 122° Fahr. They contain in a gallon—

Sulphate of lime	17.90
Sulphate of potassa	traces
Sulphate of soda	41.11
Silica	1.11
Carbonate of magnesia	3.10
Carbonate of soda	5.21
Chloride of sodium	96.48
Organic matter	3.47
Total	168.38

Carbonic acid, 47.84; also traces of alumina and protoxide of iron.

These springs are likewise strongly impregnated with sulphuretted hydrogen. They are chiefly recommended in chronic, rheumatic, and gouty affections; in certain cutaneous diseases, and in constitutional syphilitic disorders. For the latter, they are considered especially beneficial. Cases of obstinate neuralgia, perhaps dependent upon a syphilitic taint, have come under the immediate notice of the writer, in which great benefit was derived from a residence at these springs. Obstinate and intractable intermittents, also, are said to be promptly relieved by their use.

California Seltzer Water.—This spring is located in Mendocino County, in the Coast Mountains, within easy access. They yield about 2400 gallons daily. From each pint of water, analysis yields—

Free carbonic acid	abundance
Bicarbonate of soda	6.65 grs.
Carbonate of lime	8.80
Carbonate of magnesia	5.65
Chloride of sodium	2.15
Carbonate of iron and silicious acid	traces
Total	23.33

The water of this spring is antacid, slightly diuretic, and in large quantities laxative. It has an agreeable, alkaline taste. The reporter has found it beneficial in certain functional stomach disorders, and, if its composition is an index of its therapeutical value, it ought to be serviceable in some forms of chronic rheumatism.

The temperature of the spring is not stated. It is a *cold* spring.

"PACIFIC CONGRESS SPRING."

This spring is pleasantly located in the Coast Range Mountains, eight or ten miles southwest of Santa Clara. The accommodations for visitors are excellent, and it has become one of the favorite watering places of California. The water is more decidedly laxative than that of the California Seltzer Spring, and it would appear to be of benefit in some diseases of the liver, in habitual constipation, and in rheumatic and gouty affections. It contains a larger proportion of iron than any of the springs of which an analysis has been received.

Like the Seltzer water, the Vichy water, and some others, it is delivered in the principal cities. The contents of *one gallon* of water are stated to be—

Chloride of sodium	119.159
Sulphate of soda	12.140
Carbonate of soda	123.351
Carbonate of iron	14.030
Carbonate of lime	17.295
Silica, alumina, and trace of magnesia	49.882
Total	335.857

Temperature 50° Fahr.

"*New Almaden Vichy Water.*"—The spring from which this mineral water is obtained is located a short distance from the New Almaden Quicksilver Mines, in Santa Clara County. It has already acquired considerable reputation in cases of gouty and rheumatic affections. It is of value, also, in certain gastric disorders, and in debilitated and chlorotic conditions of the system. We have regarded it as one of our best mineral springs—non-sulphurous. The proportion of bicarb. soda contained in it, about 200 grs. in a gallon, is remarkably large, as well as its solid contents generally.

The analysis furnished us gives, in each *quart*, the following result:—

Carbonic acid	28.2
Bicarbonate of soda	50.3
Bicarbonate of lime	8.
Oxide of iron	1.2
Sulphate of lime	10.5
Sulphate of magnesia	3.
Chloride of sodium	8.4
Silica	traces
Solid matter	108.16

"NAPA SODA SPRINGS."

This water has been in common use for the past fifteen or more years, and was formerly recommended by some of our best physicians for its antacid, aperient, and tonic properties. It is located on the mountain side, five miles from Napa City. Temperature 68° Fahr. We have obtained in one quart, the following analysis:—

Bicarbonate of soda	3.28
Carbonate of magnesia	6.53
Carbonate of lime	2.72
Chloride of sodium	1.30
Subcarbonate of iron	1.96
Sulphate of soda	0.46
Silicous acid	0.17
Alumina	0.15
Loss	0.62
Residuum from evaporation	17.19

There are many other springs which have acquired more or less reputation, in some instances, well founded, of which no analysis can be obtained. Among these, the "Tuscan Springs," in the foothills near Red Bluff, in the northern portion of the State, are, perhaps, particularly deserving. They are several in number, possessing different properties. They are said, upon the most reliable medical authority, to have proved decidedly beneficial in chronic cutaneous diseases, syphilitic and from other causes; also in rheumatic affections, and in obstinate intermittents. The water, in at least some of the springs, is sulphurous, and of a high temperature.

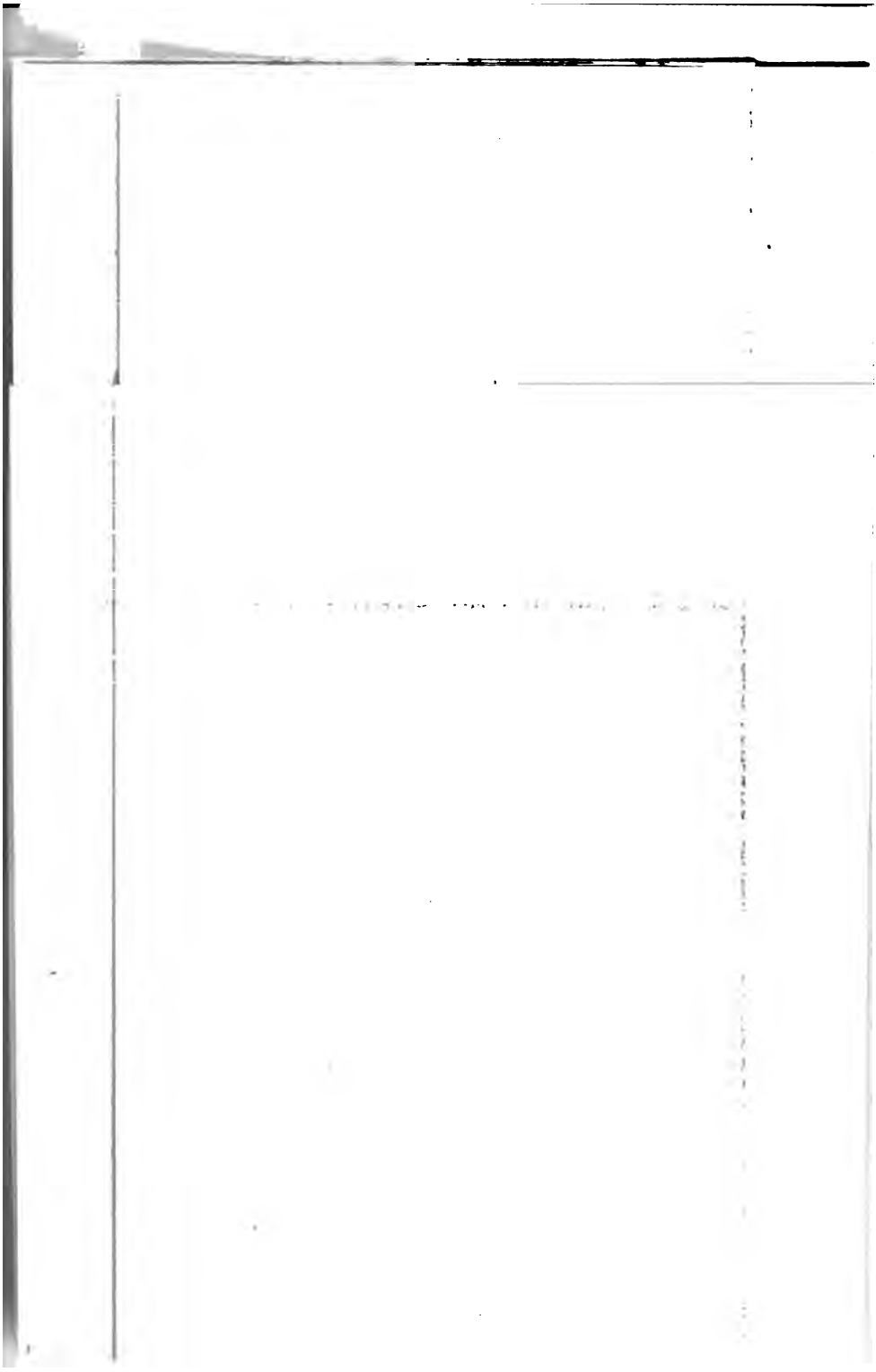
The "Harbin," and the "Boone" or "Seigler" Springs, in Lake County, in the Coast Range, have attained some notoriety, also, in similar affections. Of the former, we are informed, that the water used for bathing purposes is 112° Fahr., strongly sulphurous. It is to be regretted that no analysis has been made of the water of these springs, as there is abundant evidence of their medicinal value in the diseases alluded to.

Dr. Cabanis, in his communication previously referred to, speaks of several valuable springs as far north as Siskiyou County.

The prevalence of rheumatism, especially in its chronic form, as we have shown in the body of this report, and of cutaneous affections in different portions of the State, renders a knowledge of the adaptability of our mineral waters to their relief, a subject

of great interest to the profession. In the brief sketch given above, we have been guided partly by our own observation, but mainly by the authority of medical men whose experience in their use has rendered their opinions reliable.

Future observation, a more extended and more accurate analysis of their effects in disease, will, it is not doubted, give to some of them a reputation unexcelled by that of any of the mineral springs of our country.



REPORT

ON THE

CLIMATOLOGY AND EPIDEMIC DISEASES OF DELAWARE.

BY

L. P. BUSH, M.D.

REPORT ON THE CLIMATOLOGY AND EPIDEMIC DISEASES OF DELAWARE.

In accordance with my appointment as the Committee on Climatology and Epidemics for the State of Delaware, I have endeavored to obtain what information is available upon this subject; although I am well satisfied that the geographical limits of the State are so small—being only ninty-five miles in length, by an average of twenty-five miles in breadth, though considerably diversified in soil and face of country—as to afford but little of the varied and interesting detail which may be found in the larger States of our Union.

The three counties of this State are New Castle, Kent, and Sussex; New Castle being the most northerly, and Sussex the most southerly.

The northern twelve miles of the State is of the primary geological formation—is hilly and rocky—the gneiss and feldspar being the most abundant character of rock; limestone, serpentine, and granite being also present, but in circumscribed localities; and the general character of the soil argillaceous, mingled frequently with gravel. South of this, for ten or twelve miles, is found the red-clay region—the secondary formation—which, commencing in New Jersey, runs across the State, and through Maryland and Virginia.

The southern border of the red-clay region passes into the greensand formation, which consists largely of lime and potassa, and hence this district is so valuable agriculturally. Still further south, we meet the tertiary formation, shown in the alternation of clay and sand, and abounding in organic remains, chiefly shells. Further down, and embracing the whole of Sussex County, and the lower part of Kent, we find the level sandy country, which may be considered of recent formation.

The early history of this State was marked by the prevalence of

malarious diseases, in the most severe forms in which they occur in this latitude. The forts and villages of the early settlers were necessarily placed on the borders of navigable streams, as more accessible by their ships, and because of the occupation of the interior by the untamed aborigines; into whose hands they wisely refrained from trusting themselves too far. This position involved the presence of a high dew point, which, with a summer's sun and teeming vegetation, developed violent forms of malarious disease. The life of the pioneer must, in all new countries, be one of privation, energy, and bravery, both as it respects danger from wild beasts, and wilder and more savage men, and also from new and more violent forms of disease.

The combined causes of diseases just mentioned existed especially along the flat portions of the Atlantic coast; and the history of one section is the history of all. Even within fifty years, considerable portions of our State were almost uninhabitable to those who entered them from more elevated and dry portions. Agues long continued and unmanageable, with their twin sister remittents; bilious pneumonias, uncompromising and often fatal; and dysentery, breaking down the vital forces reduced by preliminary fever—these were the tyrants of sections of this State for nearly two hundred years.

The records of the days before the discovery of cinchona show how earnestly the medical profession sought among the theories and practice of the past for relief to their suffering patients; and how often the salutary efforts of nature, declaring themselves above the too frequently exhausting treatment, carried the sick one safely over the struggle. Even the use of the Peruvian bark, so rich with blessing, failed in many instances to neutralize the malarial poison, which the patient drank in the evening breeze, so exceedingly seductive, and ate by day in his strong and heavy food.

But the gradual drainage, and cultivation of the lowlands, together with the use of lime, have changed the face of the country, and not less its hygienic character, although the southern section of the State must still possess a higher hygrometric rate, by its supply of moisture from the ocean, the Delaware River, and its own streams, swamps, and mill ponds, as well as from its slight elevation above tide-water; and be always more liable to malarious, rheumatic, and pneumonic affections, than the more elevated sections.

The underlying soil throughout the greatest part of the State is alike argillaceous; but, while the greatest elevation in Sussex County is not more than sixty feet above tide-water, in New Castle County, the hills rise to three hundred or four hundred feet. The type of malarial fever to which that region is disposed is intermittent and remittent, generally controllable, especially the latter; while the congestive or "pernicious" form is but seldom met with. Neither scarlatina nor rubeola in their outbreaks has shown a degree of severity at all peculiar; and the diphtheria has been only an occasional visitor. In the sections most exposed to paludal influences, the intermittent and remittent fevers may be found on every return of autumn; but, at certain not well-ascertained intervals, epidemics of intermittent spread over not only the section ordinarily subjected to its influence, but extend into the more elevated and well-drained situations, where they had been considered as almost having ceased to occur. The year 1846 was especially characterized by this prevalence of intermittents, not only in Delaware, but also in Maryland and New Jersey, and in the newly occupied sections of Illinois, and some other States bordering upon the Mississippi. Large sections of the State are now comparatively free from these malarious diseases where formerly they were prevalent; and, as an improved agriculture and increasing railroad facilities are rapidly spreading throughout our State, we may look for growing wealth and intelligence, and for our hygienic condition to be proportionately modified.

The most fatal outbreak of malarial fever in New Castle County, of which we have any knowledge, occurred during the excavation of the Delaware and Chesapeake Canal about the year 1824, when many of the laborers employed in the work fell victims to the violence of the disease; and the whole neighborhood, for the time, was brought under its influence. No record of that occasion was preserved, and the fact can therefore be noticed only in general terms. The causes were found in the upturning of the soil, the excavation of swampy land, the formation of lakes where none existed, and the drainage of old ponds.

To what extent the typhoid fever has formerly existed in the southern counties of this State, in the malarial districts, is in a great degree problematical. At present it is occasionally met with both simple, and complicated with malaria. Probably it was always present, in some measure, since the settlement by Europeans. In an epidemic which prevailed in and around Wilmington in 1825 and

1826, "bilious fever" and "typhus mitior" existed to a great degree, not only on the partially drained marshes south of this city, but also on the hills above the Brandywine, where malaria can scarcely originate. These continued fevers lasted from three weeks to two months; but the term "typhus mitior" continued, and typhoid fever had not then been clearly defined; and we only infer from the localities where the disease spread (in some of which no malaria could be found, or at least not enough to excite bilious remittent fever in the severe form which the prevailing disease assumed in those years), that many of the cases were really typhoid fever.

The earliest notice which we have of remarkable disease in the northern county (New Castle) was in the years 1797 and 1798, when the yellow fever made its appearance in Wilmington, and, in the latter year especially, created such a degree of alarm, that as many of our citizens as could leave home went into the surrounding country. The population of this place was then not more than 2500, but the loss out of that number by the disease was, according to *Ferris' History of Delaware*, about 500. The type of the disease was similar to that in Philadelphia, and the fatality reached about the same proportion. In 1797 the fever appeared in Sussex County, but to what extent I have no information. The fact is simply mentioned by Dr. Rush. This is the only time that I have ever heard of its appearance in either of the two lower counties, except in isolated cases. In 1802, the disease again showed itself in Wilmington with considerable severity and fatality. In the year 1853, a few cases appeared on the north banks of the Brandywine, near the lowlands on tide water, originating at an old shipyard, and confined to that locality. Several deaths resulted from the disease, no communication with any foreign source had existed, and the cause, after a careful examination, could be ascribed only to the offensive bilge water in an old vessel recently brought to the place, together with the decomposing vegetable matter which had been accumulating for years in the yard. A report was made of these cases in *The American Journal of the Medical Sciences*. The same season appeared those cases in Philadelphia, which were generally referred to the ship "Mandarin," and of which many were fatal.

Wilmington has been the subject of two visitations of cholera, in 1832 and 1849. The population in 1832 was about 10,000. The disease was chiefly confined to the northern section of the town, which is the best drained, and of average cleanliness, ex-

cepting only, *then*, that a number of somewhat offensive soak pits for cooper's stuff existed there. The visitation was not severe. In 1849 it appeared again, but this time chiefly in the almshouse, which was at that time about a half mile from the inhabited parts of the city. Its fatality there was such that three-fourths of those attacked died, and it threatened to depopulate the building, which contained about a hundred inmates. With a view to counteract any deleterious influences which might exist in the atmosphere of the house, the floors were scrubbed, and both these and the walls were covered with lime and chloride of lime, but the disease went on. In this emergency, shanties were erected in a field about a hundred yards distant from the house; and all the unaffected inmates were removed into them. From this date the disease ceased. This is but an isolated case, of a very limited character; but is to the same point with many others in the history of the cholera in India, and in our own country. The first case of the disease occurred June 29, 1849, and the last case, August 3, making thirty-six days, in which time there were reported 116 cases, of which 78 were from the almshouse, and 38 from the city.

Deaths in the almshouse	47
" " city	18
	65

In the other sections of the State, cholera has existed only in isolated cases. In 1859, the chlorea was followed by the most severe form of dysentery that has prevailed in this place for the last forty years. It would be difficult to specify the most successful mode of treatment, but it is certain that Hope's nitric acid and opium remedy exercised a most favorable effect in some cases far advanced in the disease.

Of all the epidemic forms of disease which have prevailed here of later times, a special notice may be made of typhoid fever during the years 1847, 1848, and 1849. To understand the topography of the place, and the preliminaries of its occurrence, it may be stated that the eastern section of the city has a clay substratum, and is flat, while what was then the western portion is elevated, and is based upon a sandy subsoil. Few cities are better drained. From the ridge which rises in the centre of the city to the height of one hundred and twenty feet above low-water mark, the ground falls rapidly to both the Brandywine and Christiana rivers, which are about one mile apart. Beside this, the attention

of the Board of Health to the hygienic wants of the city was carefully afforded. Just previously to this period, the population of the eastern or lower section of the city had increased some five or six thousand, involving necessarily the removal of the loamy covering of the ground, and the exposure of the clay substratum, in order to the erection of dwellings. In addition to this, the city authorities were just then engaged in slowly removing the water mains in the centre of the city, producing in some places accumulations of water, and of upturned earth, impregnated in some cases with gas from the gas pipes. The healthfulness of the city of Wilmington, for fifteen years previously to this period, had been good.

From the year 1837 until 1846 it was quite rare to meet with a case of intermittent fever in or about Wilmington, unless the disease had been contracted elsewhere. But in the autumn of 1846, as has been said already, the equilibrium of the public health was disturbed by an epidemic of intermittent fever. I have said epidemic, for I am not aware of any local causes which, alone, could have produced so sudden and remarkable an eruption of that disease.

From the meteorological register of the Pennsylvania Hospital (and the same facts apply in the main to Wilmington) I find that during the years 1845 and 1846 the average number of clear days was greater than for ten years previously, viz., as 220 to 146; while the number of days on which rain fell the whole of the day was, for these two years, as 28 to 35, for the ten years before. The amount of rain from 1835 to 1840 was 49 inches, annual average; from 1840 to 1845 was 41⅛ inches average; and from 1845 to 1850 was 43⅞ inches annual average; while in 1834 and 1848 a smaller quantity, and in 1841 and 1850 a larger quantity, fell than in any years in the preceding twenty years. In neither the years 1846 nor 1847 do we then find extraordinary drought or moisture (as to furnish a reason for the prevalence of intermittent fever) though the former of these years was a dry year, but as the drains or ditches, which run through the highly cultivated meadows south and east of the town, communicate with the Christiana and Brandywine creeks, and are measurably filled at each flow of the tide, and no marshes near us are subject to inundation, there seems no sufficient reason from this to deduce the cause of unusual intermittent fever. Besides, this epidemic did not exist here alone, but extended to portions of New Jersey

not subject to the disease for many years. It would seem proper then, in the light of these facts, and in the absence of any others to prove the contrary, to conclude that this was an epidemic of intermittent fever, not having a local cause of sufficient energy to have developed the disease to such an extent, independent of a remote predisposing cause; though its prevalence, especially in the lower and more damp parts of the town and neighborhood, shows that more exciting causes were there present. My own recollection, and facts from other sources, convince me that, in regard to the intermittent fever of the years from 1823 to 1827, before alluded to, it was not only more universal but more unmanageable than that of 1846; which might have been expected, as the amount of drainage and cultivation in and about Wilmington was much less at the former than the latter period.

The intermittent commenced, and attained its greatest intensity in the year 1846; and in 1847 it had greatly declined, and subsequently it has been rare.[1] Thus much for the antecedents of the typhoid epidemic.

In 1846 we had a few cases of typhoid fever, which very materially increased in number and gravity in the fall and winter of 1847, through the whole of 1848, and into January, 1849, when it abated. It returned in May of the same year, but its attacks were less grave; and from that period, during the prevalence of the cholera and of the subsequent dysentery, very few cases occurred. Later in the year it again appeared, but subsided during the winter, and was scarcely known again until the fall of 1850, when it returned to a considerable extent for several months but in a mild form.[2] These variations were not influenced so much by any external circumstances as to enable us to arrive at any definite conclusions as to their cause. Heat or cold combined with moisture seemed at times to aggravate the number and severity of the cases, but such was not uniformly observed. Nor does it appear from the meteorological reports above quoted, that anything remarkable in the state of the weather existed in these years, 1847, 1848, and 1849.

What shall be said of its cause? Various conjectures upon this point have been suggested by both professional and unpro-

[1] No similar prevalence of intermittent fever has taken place since, though twenty-five years have passed.

[2] Since that date, to the present time, 1872, this disease has not existed to an extent at all alarming among us.

fessional men among us; but nothing which seems sufficiently definite for its elucidation. The extension of the city and the renewing of the water pipes have been alluded to, and to some minds may be sufficient. As regards the general cleanliness and ventilation among the people, it cannot be affirmed that their habits were different from what they had been for many years: giving rise to ochlesis or crowd-poisoning; and hence, whenever a case occurred, and there were many, which could not be ascribed to contagion, it would seem reasonable to ascribe it to epidemic influence. The beginnings of the disease were in the lower parts of the city, whence it spread gradually to every part. A brief notice of this disease as it prevailed in 1839, and for two or three years afterwards west of Wilmington, is interesting, as tending to indicate an epidemic character.

From the western boundary of Wilmington, to the western limit of the State of Delaware, a distance of about seven miles, and onward through Chester County, is a beautiful, rolling, and well-cultivated country; excelled perhaps in the elements of salubrity by no country in the Middle States. In the year 1838, occurred the first cases near the Brandywine Springs, about four miles west of Wilmington. They were of an aggravated form, and several of them terminated fatally from intestinal hemorrhage or perforation. From this point it spread, in the next six years, north and west, over a section from six to ten miles square, and exhibited much virulence and fatality. Personal observation during life, and inspection after death, with the history of many cases derived from the intelligent physicians of that section, left no room for doubt as to its character. The disease in the first cases seemed to have been communicated by one of the nurses to her family, she herself having fallen a victim to it. But, while cases occur every year since in the same section, it has not spread to any alarming extent from that date to the present (1872); and this leads me to conclude that some diathesis, or epidemic influence, was at the bottom of it.

Is it not just to conclude that the same obscure influences, which there brought into operation this disease, under circumstances apparently so unfavorable to its development and propagation, should, also, here have given rise to it, and contributed mainly to its continuance, and that these causes were epidemical? I may state that, although, both previous to the epidemic and during its continuance among us, cases occurred which might be referred to direct

contagion, no such influence could be traceable in a large portion of the cases which came under notice here. Numerous instances might be brought to illustrate this point, but the general conviction here among physicians is, that the degree of contagion is very low, and almost if not entirely destroyed by attention to cleanliness and ventilation.

I am aware of the little value which is attached to the general observations of physicians in regard to the causes of disease; but cannot refrain from stating, that, while in some cases the disease seemed clearly to originate from contact between the subjects of it, yet many exposed to its influence, as nurses, or living in the same dwelling, escaped; while others less exposed, or apparently not at all, became affected with the disease in its most violent forms. And, even when the predisposition to it might have been supposed to be generally present, from the fact of the fever existing in all parts of the city, still very many living and sleeping in small tenements, wretchedly-ventilated chambers, overcrowded with inmates, with unwashed bodies, and bedclothes saturated with effluvium, escaped the disease; while others, living in conditions just the reverse of these, were prostrated by the fever, even to death. About ten years ago, while Professor Jackson was on a visit to Wilmington, I proposed to him the question of the cause of this disease, especially in the elevated, well-drained, well-cultivated country west of this city, among the well-cared-for farmers there; but received, as his opinion, that we had then been unable to trace with any satisfaction the causes and modes of origination of typhoid fever. Dr. Jackson was then over seventy years of age, and had given to this subject his best powers of research for forty years, but had been unable to reach any satisfactory conclusion. He was the first teacher in Philadelphia to discriminate clearly between this disease, typhoid and remittent fevers, and impressed it upon his students in 1837; and was followed by the clear and full teachings of Drs. Gerhard and Pennock in the Blockley Hospital. He was fully prepared to look fairly and distinctly at this question with all the light of his time, and the clearness of his judgment. Have we made any further progress as yet in fixing its causes and modes of communication? Is not a negative reply all that we have yet received from the best observers and experimenters of our day?

In the winter and spring of 1848 and 1849, while the typhoid predisposition still existed among us, we were visited by an

epidemic of jaundice, in a mild form; a disease of which we have no knowledge as having so extensively prevailed at Wilmington previously.

An opinion has been entertained that intermittent or remittent and typhoid fevers, so far, as was once supposed, from originating in the same causes, or the latter being produced by the former, are antagonistic to each other, the latter not finding a congenial place for itself until the former has been eradicated. But the facts above stated prove that either the same prevailing cause may give rise to both (which, however, cannot now be entertained); or that though the cause be different in each form of disease, they may coexist in the same place. For though the intermittent had greatly subsided on the approach of the typhoid, yet it has not even to the present time as completely abandoned our neighborhood as before its irruption in 1846; and, further, the prevalence of jaundice with the typhoid shows anything else than a freedom from malarious influences. If, however, we admit, that ochlesis, or the crowd-poison of Gregory, forms the remote cause or basis of typhoid, while intermittents are the product of malaria, we at once find the explanation of the sporadic existence of each, separately or complicated, as the causes may be distant or commingled.

It would be hardly necessary to enter into a detail of the symptoms which ushered in and accompanied the typhoid fever. These are so distinctly laid down in the works on Practical Medicine of the present day, that I will confine myself to a few points in its history, worthy of specification. In its general character, it assumed every grade from the mild form in which the patient with no conspicuous symptoms merely found himself unable to attend to his ordinary business, to its most violent and fatal aspect; and varying, also, in regard to the mode of the development of the phenomena, as the cerebral, or spinal, or abdominal systems were most deeply involved.

During the first eighteen months of the disease, the symptoms were more violent, intractable, and fatal, than in the subsequent two years. Cephalalgia was a very prominent symptom in the first onset of an attack, and for the first eighteen months was but little relieved by any of the means resorted to; but, after that period, it was more amenable to treatment. A very common symptom was pain in the back of the neck, of greater or less severity; not connected necessarily with the headache, and often passing away after the first week.

The diarrhœa was not always found, even in the simple form of looseness, either in the premonitory stage, or during the progress of the fever, though it was usually present, and the discharges then had the thin and yellow or olive and granular characters; nor were the abdominal tenderness, or gurgling on pressure of the iliac region, or tympanitis, or rose-colored spots, always met with; though their almost uniform constancy led us always to look for them. Sometimes one of them was absent, sometimes another.

The epistaxis was a frequent symptom, as was also the hemorrhage from the bowels; though the latter was much less so than the former, and always considered a grave symptom. Perforation of the bowels, with consequent peritonitis, occasionally broke forth with startling suddenness, leading us, by the uncertainty of its attack, without premonition, and its fatality, to apprehend it, even in the mildest forms of the disease.

In the early stage of the disease, there was most frequently insomnia; but as the disease advanced, drowsiness often succeeded it. The latter was less to be dreaded; though sometimes terminating in stupor and death; while the continuance of the former necessarily produced delirium and fatal exhaustion. Delirium was common, in the first stages remitting, and easily interrupted by a question addressed to the patient; but, later in the disease, or in more violent forms, often persistent to the end of life. As regards the other symptoms usually present, the tongue was generally coated in the beginning, but soon became clean, papillated, red, and dry; nausea and vomiting were rare; the pulse varying, according to the gravity of the case; a rate over a hundred in the first week was considered an indication of a serious case. The bis-feriens and the irregular pulse were not uncommon in the severest forms. Of all the symptoms, none was more constantly present than tympanitis. Involuntary discharges and retention of urine were occasional and unfavorable symptoms. In the severe cases, there was usually, in the first ten to fourteen days, three exacerbations of fever in twenty-four hours; in the latter part of the morning, in the evening, and towards midnight, more frequently an exacerbation occurred only in the morning and evening.

As regards the treatment of the disease as practised at that time, it may be well to mention it generally, although the views of the profession in this respect have undergone some change. If we look back to the report of Dr. Jackson, of Boston, published in 1838, we will find that he made a considerable advance in the treatment of

typhoid fever. Dr. Holyoke, his preceptor, depended chiefly upon tartar emetic and calomel for the evacuant and alterative effects. Dr. Jackson, by careful observation, was gradually led to conclude that this energetic treatment was not appropriate, and abandoned it for a milder and more rational method, as we now believe.

Professor Jackson, of Philadelphia, also greatly modified the system of practice in the wards of the Blockley Hospital. Having some degree of confidence in the doctrines of Broussais—then so widely read, and really influential—and unwilling to follow the heroic treatment which was in favor when he entered upon the practice of medicine, he through his clinics diffused his views among the students of the University of Pennsylvania, leading them to confide less in the accepted practice, and to look out for something better in the milder form of treatment, then generally known as the Physiological method. Wedded to no system, he sought through all the facts which he could gather from whatever source, for principles upon which disease might be most rationally and advantageously treated; and I am well satisfied that his teachings have had very much to do with the change which has taken place in this country in favor of the treatment of disease by a more mild and expectant plan than that formerly pursued.

In the onset of the disease in Wilmington, we used some mild mercurial with laxatives, if constipation existed, but not otherwise; and occasionally, when dry, brown tongue occurred, mercurials were used in small or "alterative" doses. But the propriety of this was a question with some; for, whether the state of the liver were considered, as we had generally found it in this disease in autopsies here or in the Blockley Hospital, no signs of change in its structure being apparent, or the character of the alvine discharges, which were quite different from what we see in acute diseases of the liver, the use of mercurials did not seem to be called for, and hence were not resorted to as constantly as in former times. Emetics formed no part of the treatment. Leeches to the temples and cups to the nucha were used to relieve pain in the head and back of the neck, and in the early history of the epidemic often failed to do good, but occasionally seemed very useful. In more recent cases, I have been satisfied that 8 or 10 grs. Dover's powder, or $\frac{1}{8}$ to $\frac{1}{4}$ gr. sulph. morphia, would compose the patient to sleep, and in many cases relieve the cephalalgia. What would have been its effect in the more grave and unmanageable cases which occurred in 1847 to 1849, I cannot say, but, believing that the pain

is at least in part neuralgic, I apprehend that many cases would have been materially relieved by this means. But not only was the sulph. of morphia competent to produce sleep and relieve cephalalgia, but also to prevent and even arrest delirium from excessive cerebral irritability with insomnia, which otherwise must have resulted in fatal exhaustion.

In a sufficient number of cases to satisfy us of its inefficiency, sulph. quinine was given in the commencement in daily portions of 10 grs. repeated for several days in succession, but in no case was the disease arrested, or seemed materially shortened, although in a few cases the fever was mitigated for forty-eight hours.

The use of citrate of potassa, of chlorate of potassa, of spts. mindereri, with spts. of nitre, were in favor during the progress of the fever; while quinine, or decoction or cold infusion of cinchona by displacement, with or without serpentaria and mineral acids, were the tonics most relied upon after the fever had given way in some degree, and perspiration had come on. The practice recently advocated, of the free use of quinine, brandy, and beef essence from the commencement of the fever, seems to me highly reprehensible, and calculated not only to increase the distress of the patient, but also the danger. It is the antipode of the old reducing practice, but is not much, if at all, nearer the truth. Brandy, whiskey, or the light or stronger wines, or wine whey, as the disease advanced, seemed to be demanded by the debility and state of the bowels, and were the stimulants used then as now, and the farinacea, with extracts of meat, were prescribed for nutriment, though, no doubt, then and still the stomach, enfeebled by disease, was often overloaded by the abundance of food.

It is but just to refer, in the matter of treatment, to some of the old masters of our art, and, if we consider the wise suggestions of Huxham, in 1750, we will be compelled to admit that scarcely any improvement has really been made upon his principles of practice in this fever, called by him "the slow nervous fever." If the following remark which he makes in the conclusion of this treatment of this disease had been delivered by some eminent professor of the present day, it would have been received as fraught with wisdom, by all thinking men of the profession. "In a word," says he, "whether in miliary fevers or the slow nervous fever, the sole end of medicine should be to assist nature in her operations, and support her under them; but in such manner as may comport with the general laws of the animal economy; promoting by art

where the discharges are deficient by nature, or restraining them when profuse and inordinate, taking care at the same time never to pervert, in any particular disease, any particular crisis which, by just observation and long experience, hath been found regular, constant, and salutary, but always to favor it."

If we should undertake to find an apology for the violence of the treatment to which, in the eighteenth and early part of the nineteenth century, the practitioners of this country subjected their patients, we would refer to the severity of the attacks of disease to which our forefathers were subject, originating in their modes of living, and exposure to miasmatic and hygrometric influences, of which many sections of our country now know nothing, and which, in others, are greatly modified. Fearful of relying at all upon the powers of the vital energy to combat such fearful symptoms, they abandoned the sage counsels of Huxham, and often, no doubt, carried their interference far beyond the requirements of the circumstances, and thus added to the power of the disease by the exhaustion of the patient.

Is it worth while, to cite here the conclusions at which he arrived in regard to the diagnosis between this and typhus fevers? Louis and Chomel thought they had settled that question half a century ago, but to many minds it is yet an undecided one. It may be said, that our observation, in the light of careful examination in life and research after death, satisfied us that there was no admixture of the diseases here. No petechial spots were found, or only in a few isolated cases; nor were any cases inspected *post-mortem* which were free from a greater or less degree of ulceration of Peyer's glands. This might be stated more in detail, but it is perhaps inappropriate in this report. While we say this, it is also a firm conviction that the affection of the bowels is only secondary to the more profound disorder of the general system; that is to say, the diarrhœa, the tympanitis, the gurgling and tenderness of the abdomen bear no certain or definite proportion to the general disturbance, nor to each other, though, as might have been expected in a disease exhibiting so much debility, the persistence of free diarrhœa aggravated most of the symptoms. But still the marked development of the above symptoms, the diarrhœa, etc., is not necessary to a fatal result. Repeated autopsies proved that the most extensive ulcerations of the bowels, even ending in perforation, were compatible with a train of symptoms not indicative of danger, and the contrary; and hence it does not seem warrantable

to assign to these lesions, or the symptoms connected with the abdomen, so high a position as they seem to have obtained in the view of Louis and some other French pathologists. At the same time, the fact cannot be unimportant, that this form of fever may prevail sporadically or epidemically in a region of country for many years, as in this city and neighborhood, and during that time no case occur, so far as *post-mortem* examinations were made, in which the general or local symptoms, or both, did not coincide with ulceration or at least tumefaction of Peyer's glands. Were we to take the evidence derived from the prevalence of the disease among us, it proves, as far as it goes, that the uniform tendency of the influences operating around us has been to produce a disease bearing the characters of the typhoid and not of the typhus form of fever, clearly and unequivocally delineated in life and after death. And it is a fact of some importance, that, though a few cases of typhus fever were introduced among us by emigrants recently arrived from abroad, which exhibited the petechial eruption, and the putrid symptoms of that form of fever, and which reproduced themselves in a few other subjects, it was invariably with like characteristics, though occurring in the midst of the typhoid epidemic.

And what is the testimony of the epidemic of typhus which has been described by Drs. Gerhard and Pennock, as having existed in Philadelphia in 1835 and 1836, and which they observed in the Blockley Hospital?

In fifty post-mortem examinations not a single instance occurred of ulceration or tumefaction of the agglomerated glands where the case had been considered typhus, and where the petechial eruption existed; nor did the cases of typhoid, though being in the same wards, fail to exhibit peculiar symptoms in life, and the disease of the glands of the bowels after death. Says Dr. Gerhard, in *the Amer. Journ. of Med. Sci.*, vol. xx. p. 306, speaking of the diagnosis: "It is not only necessary to compare the symptoms and pathological phenomena, but also to examine the succession of the symptoms and their relative intensity at different periods of the disease. It is necessary to attend to this order of symptoms even in those diseases in which, from the development of the local signs, the diagnosis is easy; but in fevers about which so much confusion has existed, as in typhus fever, the most careful observation of all the points is absolutely essential. When we attempt to disentangle this confusion we must group our symptoms, and inquire

if one series occurs in a sufficient number of cases for us to admit the succession of phenomena as nearly, if not quite, constant. If this series does occur in a large majority of cases, the symptoms offer a relation which is sufficiently constant for us to admit them as constituting a distinct disease. If the most important symptoms be present, the absence of one or two, or even a large number of them, does not materially impair the diagnosis; nor does the accidental presence of some irregular symptom which is not usually met with and does not form a link of the chain render it uncertain."

In opposition to the conclusion necessarily arrived at from these important classes of facts, furnished by these two epidemics, Dr. Copland puts forward the results of his extensive observation. "Nervous or typhoid fevers may occur sporadically or epidemically, without any petechial or other eruption; or may be attended by *petechiæ* or *vibices* in their progress, and particularly at an advanced period, or by an exanthematous eruption at an earlier stage; or even by both kinds of cutaneous affection, either successively or almost coetaneously. For many years, or in successive epidemics, or even in a single epidemic, typhoid fever may appear in any one or more of the states just described; or it may assume either of these forms, associated with one or other or with both the affections of the skin just mentioned in a portion of the cases only; or the affection of the skin may be one of the most unvarying and chief characteristics of an epidemic; and of the cases composing such an epidemic, some may be of the mild, others of the complicated or severe form; some may evince more or less reaction or excitement, others may present depression of the powers of life and congestion as prominent phenomena throughout."

I should fail to do justice to my own convictions and to truth, did I not here record what is so well known to the profession—the able and energetic part which was taken by Drs. Gerhard and Pennock in the investigation of the epidemic fevers in the Blockley Hospital, in 1836 and 1837. Fresh from the clinics of Louis and Chomel, they entered upon their duties as Physicians in Chief of that Hospital, and almost immediately were thrown into an epidemic of typhus fever, with whose victims the wards of the house were overcrowded for months together. It was a new disease to them. The wards of the Hôtel Dieu, during their walks there, presented no cases of this disease, so different from their old acquaintance. Heavy muttering delirium, intensely hot skin

rising to 104° to 106° Fahr., freedom from tympanitis and diarrhœa, and above all the permanent petechial eruption, lasting even into death. These pointed to another disease than that with which they were familiar. To confirm their diagnosis of this disease, which had scarcely been seen in Philadelphia for twenty-five years, Dr. Jos. Parrish was invited to visit the wards of the hospital. He at once recognized the disease, as the "typhus gravior or spotted fever," which had prevailed in Philadelphia and its vicinity at the time when he entered upon the practice of his profession.

As strongly disinclined as I am from my own observations in the epidemic of typhus in Philadelphia, the victims of which were chiefly lodged in the Blockley Hospital, and also during the epidemic of typhoid fever among ourselves, to be an advocate of the unity of these diseases, I do not feel disposed to say that in another country, different in climate and geological character, these diseases might not become convertible, or intermingled beyond specific discrimination. The whole number of deaths which occurred in Wilmington in this epidemic, and the ages are as follows:—

From October, 1847, to December, 1849, inclusive . . .	61	
" January, 1850, to " 1851, " . . .	28	
	—	89
To 14 years of age, inclusive	19	
From 15 " " to 25, inclusive	31	
" 26 " " " 45 "	27	
Over 45 years	12	
	—	89

Whole number of deaths from typhoid fever from January, 1852, to December, 1855, inclusive, 18 deaths, or at the rate of 4½ a year; showing our ordinary rate of deaths from this disease.

The average of deaths to cases we considered to be about one in 10, which would give in four years and three months, 890 cases; or allowing one death in eight cases, 712 cases.

There is a disease which has, of late years attracted a great deal of attention from the medical profession, and justly; I mean diphtheria. Of comparatively recent delineation, as a distinct disease, its diagnosis does not seem to have been very clearly apprehended by many physicians. Hence it is often confounded with ulcerated sore throat, which is, as we know, of no new date, and is not usually, at least in this section, a serious disease.

The want of proper discrimination between these diseases—the ulcerated and the lymphy patched form, causes a great deal of unnecessary apprehension among the people, and becomes a source of

just discredit to the profession. In New Castle County, diphtheria is a rare disease. In Wilmington it has never prevailed to any considerable extent. We have seen enough to know its danger; but have fortunately never had an opportunity either to lose or save such fabulous numbers of cases of the disease, as we have seen or heard reported in other sections. Of the common ulcerated sore throat we have our full share, but it is, as before remarked, usually mild. During the past three months, rubeola has prevailed in Wilmington, but there have been no unusual symptoms attending it, excepting a tendency to diarrhœa; and therefore no special description either of it or of the treatment is necessary.

Smallpox appeared in Wilmington in September, 1871; probably introduced from Philadelphia, with which place communication is very frequent and rapid. Its presence was the signal for a general spontaneous vaccination and revaccination of the people. Theories, boastfully paraded before the regular profession by many who had been inoculated with them by physicians and anti-physicians, through newspapers and magazines, for the past twenty years, shrivelled up and disappeared before this frightful and fatal destroyer of all who had not upon them the clear and effective mark of the vaccine. The matter used by our physicians was generally that which had come down through the past generations, and no profession was made of its recent extraction from the cow. But its protective efficiency was evinced in many instances where individuals and families had been exposed to smallpox contagion sometimes previously to vaccination, in others to revaccination, and in a very few such instances were those who were brought under the power of the vaccine by its introduction within six days after the first exposure touched by the smallpox. These instances prove not only the efficiency of the *old* vaccine matter, but also the rapidity with which the vaccine matter enters, and protects the human system from the contagion of variola.

The extent of the disease in Wilmington, in a population of thirty-five thousand, from November 20, 1871, to May 3, 1872, were reported to be about as follows :—

Smallpox	182
Varioloid	190
	372

Of which there were reported 53 deaths.

In the year 1845, I made some vaccinations with a view to test

the opinion that, when vaccine matter is reinserted on the fourth or fifth day after the first insertion, both vesicles arrive at maturity at the same time. The result of the trial convinced me that the opinion was correct. In the lectures of Dr. Chapman in 1837, and generally among the medical profession of that day, the impression prevailed that vaccination was a perfect protection, always (that is through life) and in all cases, and that therefore *varioloid* must be a different disease, and not a modified form of smallpox. As a consequence of this opinion, the impression existed generally, and indeed with some persons still exists, that revaccination after a perfect pustule has been produced is forever unnecessary. I speak generally. It occurred to me just after making the foregoing experiments, that is to say, in January, 1846, to make other experiments for the purpose of satisfying myself upon this point. January 3, 1846, I introduced some pure matter into the arm of A. E. S., aged fourteen years, with well defined punctured cicatrix—vaccinated when seven years old—and on the 11th, the ninth day of vaccination, there was extensive inflammation around the vesicle, which was button-shaped.

From this crust I introduced matter January 23d into A. Groves's *forearm;* three years old, first vaccination; on 27th, fifth day, reinserted genuine matter into *arm;* on this date *forearm* showed slight elevation of vesicle and evident commencement of areola, but not diffused. On 31st, ninth day, *forearm* showed considerable areola; flat pustule, unbroken—on *arm*, fifth day pustule is pointed slightly, elevated, and contains serum. February 6th, fifteenth day, crust on *forearm* is dry, circular; on *arm*, eleventh day, more elevated in centre, not so dry, less perfectly circular.

February 22d, 1846, revaccinated W. H. P., aged twenty-five years; first vaccination done in infancy; cicatrix well defined, punctated. Revaccination arrived at maturity March 2d and 3d, twelve and thirteen days. On February 28th, seventh day, vesicle was flat, well defined edges, button-shaped, lymphy; inflammation two inches in diameter, with hardness. March 2d, inflammation more extended, defined, pustulated, itchy for first few days.

On March 11th, vaccinated I. R., five months old; first vaccination, with crust from above. March 16th, the sixth day, first pustule beginning to be lymphy, flat, or rather depressed in centre, very slight areola. I introduced genuine virus in other arm.

March 21st, eleventh day of first vaccination, has areola two inches in diameter: vesicle perfect in every respect. Same date, sixth day

of last vaccination, has vesicle with irregular areola, and is not as fully developed as the first slight fever.

On March 11th I introduced matter from W. H. P. into *forearm* of S. C. L., aged six months, first vaccination. March 17th, seventh day of first vaccination, vesicle pearly, flat, slight areola; introduced genuine matter into *arm;* both at the height on March 21st, eleventh and fifth day respectively; on *forearm*, pustule flat, regular in circumference, inflammation extended nearly to wrist and elbow, with chill and fever. On *arm*, pustule irregular, elevated in centre with defined areola.

These are the best recorded cases of vaccination from spurious, or secondary, and genuine virus, from my note book. A number of cases, with the same results, were vaccinated about the same date. The conclusions to which I arrived were as follows; that is, so far as a limited number of cases would admit:—

First, that revaccination, in a case where there is reason to believe, from the appearance of the cicatrix and other concurrent circumstances, that it was effective, will, after a number of years and in a certain proportion of cases, produce a vesicle bearing more or less of the characteristics of a genuine vesicle.

Second, that the matter from this vesicle will produce, in primary cases, the same apparent effects as the genuine virus, inasmuch as it occupies the human system so as to cause the vesicle from the genuine matter to abort, when the latter is introduced on the sixth or seventh day after the first insertion.

Third, that a certain degree of exhaustion of protective influence, therefore, takes place in many cases; or else the virus could find no nidus in which to reproduce itself—or, in other words, no support for its growth. This is evident, as no specific effect results from the introduction of the virus immediately after a primary vaccination. Hence, the importance of revaccination after some years have elapsed.

The analysis of statistics of smallpox has, since the time when these experiments were made, educed the same conclusion in regard to the necessity of revaccination, in order to protection from smallpox.

These cases and deductions are given, not as conclusive or fully ascertained, but only as my own convictions, to be more fully illustrated or else disproved by others.

Some time after I had finished these observations, I found that Dr. Kirkbride, of the Philadelphia Insane Hospital, had instituted

a similar series, and had reported them in the American Journal of the Medical Sciences of Philadelphia.

I wish to remark that although I feel satisfied of the foregoing conclusions, yet, with my present light, I have never been willing to use the virus from a revaccination, to protect a person from smallpox, inasmuch, as although its influence might be sufficient for the time, I have nothing to assure me that its power would be as enduring.

In reply to certain questions proposed to a number of physicians of this State, I received the following statements:—

Dr. J. E. Clawson, of Smyrna, Kent County, reports that rubeola and parotitis have been prevalent of a somewhat severe type, but not seriously complicated: treated by mild sedative remedies.

He reports that intermittents and remittents, and typhoid fevers, are less frequent than ten years ago, which he attributes to the improvement of the face of the country by clearing up, and draining swampy and marshy lands, underdraining with tiles, and the free use of lime as a fertilizer. Also the undamming of the waters of old and useless mill-ponds during the winter season, and allowing the pond beds to dry up, preparatory to bringing them under cultivation.

He considers hygienic means the best adjuvant to quinine in preventing the recurrence of intermittents.

Dr. Charles H. Richards, of Georgetown, Sussex Co., states, that "no considerable epidemic has visited this county within the past year.

"Early last summer, diphtheria in the southeastern part of the county exhibited the malignant form which had characterized it the year previous; and, having proved fatal among the children of two or three families, ceased entirely.

"Intermittents and remittents are rather less common than formerly. The most reliable treatment, especially of the latter, is first a cathartic containing a mercurial preparation, then to charge the system with quinine, also using refrigerant diaphoretics *pro re nata*, and supporting the system with good, nutritious, and digestible food; afterwards iron, mineral acids, and cinchona."

Dr. Richards agrees with Dr. Clawson in regard to the most reliable mode of permanently curing intermittents; and says: "Although intermittents as a prevailing disease cease on the appearance of cold weather, some persons have attacks of that disease with only two or three weeks interval during the whole year. I

have noticed that our intermittents are more severe for a week or two after our first frosts, and then subside."

The diminution in the frequency of intermittents and remittents is occasioned by the broad and deep ditches which have been cut through the swamps into the rivers, thus draining the adjacent lands, and when this system, which is provided for by an Act of Assembly, as also the drying up of useless mill ponds which have had so much to do in deteriorating the salubrity of this county, and in causing a more grave type of disease, shall have been carried out, the health of the county will be greatly improved. Dr. Richards says, "I have not in twenty years practice seen in this country a half dozen, perhaps not three cases, of well defined, real enteric typhoid fever; all our fevers begin in the usual way with chill, etc. Those cases that do not yield to the ordinary remittent treatment, as above described, begin in a few days to take on a low type of fever, with dry, sometimes brown tongue, generally heavily coated, and, as in ordinary remittent fever, bowels generally constipated, requiring every day or two a laxative, and by using quinine and diaphoretics, with good nursing and feeding, beef-tea, milk, brandy or whiskey, etc., they yield in from two to four weeks; quinine is generally given through the whole course with tincture ferri muriat and chlorate of potassa, etc. Some physicians think they cannot get along without mercury in some form throughout the course; while others adopt the contrary practice—more of the latter now than of the former. These cases do not yield to quinine, but this agent cuts short the exacerbations with which these typho-malarial cases are generally accompanied. We think it a good febrifuge, and strong supporter throughout the whole course of the disease."

Dr. Wm. Marshall, of Milford, writes as follows: "As to epidemic diseases, I would say that we have had none for two years past that, in my opinion, could strictly be called epidemic; though we had last summer and autumn typho-malarial fevers of a malignant type, attended with hemorrhages from the mucous surfaces (bowels usually), and petechiæ, as evidences of the intensity of the blood-poisoning.

"We have had our usual amount of pneumonia, rheumatism, and erysipelas, and no more. Now, however, we have variola, rubeola, and pertussis prevailing to a greater extent than for ten years past. For the last decade, we believe that pneumonia has been on the increase; remittents and intermittents somewhat diminished in fre-

quency and intensity; while the cases of remittents, or those usually occurring early in the season, are especially prone to assume a typhoid form or type. Typhoid fever, pure and simple, that is uncomplicated, is rarely seen here, though occasionally we do have such cases. In a district not more than seven miles west of Milford, and for a circuit of six to eight miles from that point, at Farmington, this typho-malarial fever was exceedingly malignant last summer and fall; and in the majority of cases defied all our attempts at cutting it short, or indeed of conducting it to a favorable termination.

"We have found that treatment by the use of quinia, chlorate of potassa, tinc. of chloride of iron, hydrochloric acid, and muriate of morphia, was as effective as anything; though we did not cast aside oil of turpentine, carbonate of ammonia, and camphor, as useless. In great sleeplessness, chloral, and elixir of valerianate of ammonia, combined, were often found useful adjuvants.

"Drainage and the use of lime as a fertilizer have done much, we think, to improve the hygienic condition of our section, and have lessened the number as well as the intensity of all malarial fevers; though from some cause, to us inappreciable, in some seasons, as the last, for instance, they assume a low type, which is participated in by almost every disease. Some localities in lower Delaware suffered in that respect, while others contiguous escaped; but this, I believe, is the history of disease everywhere.

"Intermittents are treated with quinia, chinoidine, and arsenic. The great secret, if any there be, in the treatment of ague, is to keep in view its tendency to recurrence; quotidians recurring on the seventh day, tertians on the fourteenth, and quartans on the twenty-first. You have only to quininize your patient on the day preceding, and continue it until the 7th, 14th, or 21st days shall have passed, to break up the disease. To be sure, the interval is to be employed in setting right any functional disturbance, either of the viscera or blood, but more particularly of the latter, as the blood in such disease loses its fibrin rapidly. . . . . It is a little curious to note the changes from one season to another in our diseases, and the difficulty in the management of the first cases occurring; while others, later in the season, are much more amenable to treatment."

These three points, Smyrna, Milford, and Georgetown, lie respectively thirty-seven, seventy, and seventy-five miles south of Wilmington, in the recent or post-tertiary formation, which embraces the lower two-thirds of the State; and the sketches here

reported were very hastily prepared, in answer to a few interrogatories proposed to the gentlemen whose names are appended to them.

The testimony of Dr. D. W. Maull, formerly of Georgetown, Sussex County, now of Wilmington, as published in the *Philadelphia Medical and Surgical Reporter* for 1858, is to the same effect as the foregoing, both as regards the great cause of the malarial diseases of Sussex County, as well as the mode of their prevention.

REPORT

OF THE

COMMITTEE ON CLIMATOLOGY, ETC., OF ARKANSAS.

BY

GEO. W. LAWRENCE, M.D.,

HOT SPRINGS, ARKANSAS.

REPORT OF THE COMMITTEE ON CLIMATOLOGY, ETC., OF ARKANSAS.

HISTORICAL.—Arkansas formed a part of the Louisiana territory. It was originally settled by the French in 1670. It was ceded in 1803 by France to the United States. According to Rev. F. Banks (reported in his Universal Geography, published during the reign of his Majesty George III.), as exhibited by a map executed by T. Bowen, Geographer, fol. 493, agreeable to treaty of 1784, Louisiana then extended from 26° to 40° north latitude. It was bounded on the north by the territory of the (wild) Indians, east by Florida, south by the Gulf of Mexico, and west by New Mexico, which is now known as Texas. In 1720, the French succeeded in making a few settlements, beside the "Isle of Dauphine" (Mobile) eighty leagues east of the mouth of the Mississippi River. These in part were ceded to England by treaty of 1763; afterward by England (together with Florida), it was ceded to the Spaniards, according to treaty of 1783, including the rivers Mississippi, St. Francis, Black, and the Mobile, Isle of New Orleans, at the mouth of the Mississippi, and the "town of New Orleans," then the capital of Louisiana; both are names originally given by the French.

The early territorial history of Arkansas is as meagre in matter of general interest, barren in material properly belonging to it, as the circumstances of its growth and development at a later period. Legends and traditions have, in the past, served, with few exceptions, the part of history. Since 1803, when the territory of

Louisiana was acquired by purchase from the French Republic, it has been separated, and afforded important political territorial divisions. Arkansas remained a part of the Louisiana Territory until 1812, when the State of Louisiana was admitted into the Union. It was created a territory March 2, 1819. Afterward it became a part of the Missouri Territory. Missouri was admitted as a State into the Union, March 2, 1821, and Arkansas was left alone, as a separate territory, organized as such with its present limits. It was admitted into the Union, as a State, June 15, 1836.

Arkansas lies between the parallels of 33° and 36° 30′ north latitude, and extends through five degrees of longitude, from 89° 40′ to 94° 42′ west longitude. It is bounded on the north by the State of Missouri, on the east by the St. Francis and Mississippi Rivers, on the south by the States of Louisiana and Texas, on the west by the State of Texas and the Indian Territory. The Mississippi River margins the eastern boundary of the State, making a shore line about 400 miles in extent. The present area of the State is 52,198 square miles, or 33,406,720 acres. The population in 1860 was 435,450. According to the census of 1870 it numbered 485,000. It is computed to be, in area, one-sixth larger than New York. Arkansas, so favored by Nature in latitudinal position, climate, soil, mineral wealth, large tracts of forest, navigable, inland, and marginal rivers, medicinal and pure, flowing springs, possessing physically good commercial relations and valuable agricultural advantages—all that is inviting—has been, since its earliest days, overlooked and overleaped, generally, by emigration.

The hardy adventurers, that desirable class of inhabitants, have turned away from the borders of this unknown division to more rigorous climates. Immigration has not been duly encouraged. The great, growing, powerful West, Northwest, and Northeast, even in territorial wilds, were rendered more accessible for exploration, and more inviting to emigrants.

THE ACCLIMATION OF RACES IS AN EXTENDED FIELD FOR INVESTIGATION.—In the new States, where the population is mostly foreign, or by migration of mixed races, in the different settlements, statistical reports will soon give us a knowledge of the facilities or power of adaptation of the various types of mankind in acclimation, and the relative mortality, compared with the native born, among the different immigrants or settlers in those countries, will add a valuable

page—one hitherto unknown to medical climatology. Those from cold, rigorous sections abroad, leaving their native soil for more temperate climates, or from milder regions to colder sections, making great alterations in the change from one region to another, contrary to general supposed laws of health or of climate, will have something to declare of statistical import. In other words, we can ascertain the effects of a new residence, where meteorological vicissitudes are constantly operating, or exercising an influence upon the constitution, different from that of usual habitation.

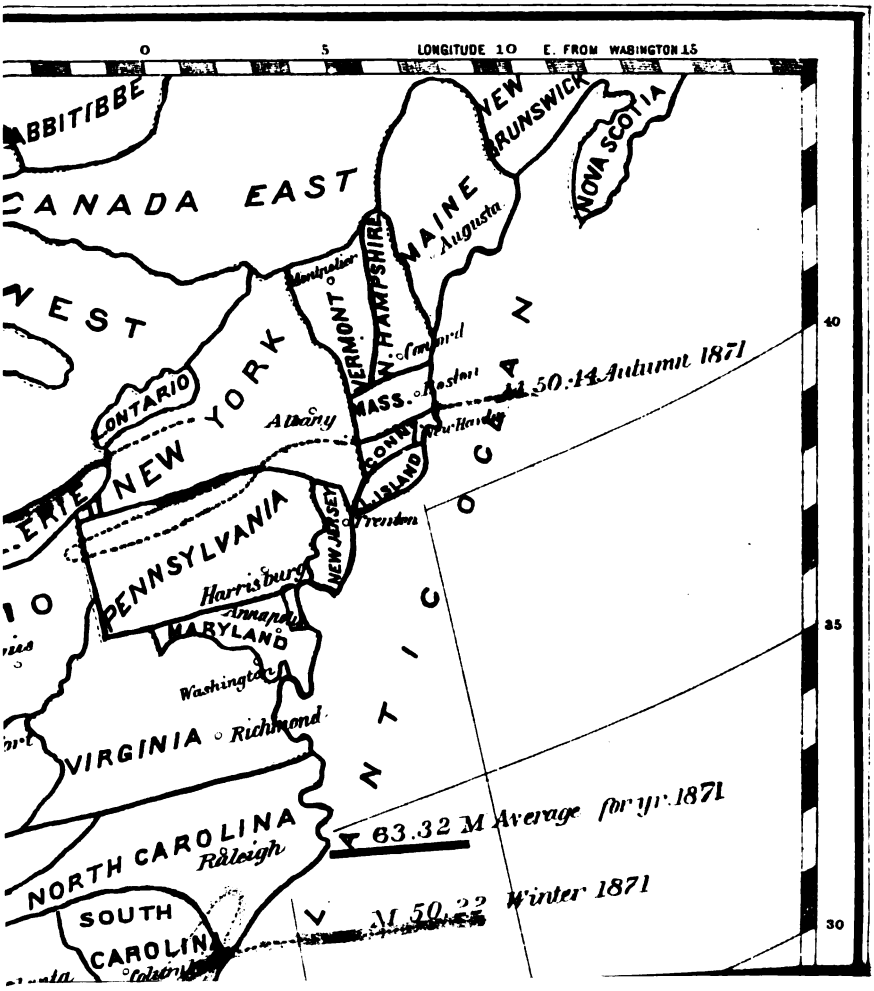
UTILITY OF RACES.—It is well known that some races of the human family readily overcome the difficulties to be encountered by immigration far better than others, and that those conditions or powers of adaptation have many interesting features for scientific thought. Acclimation appears to be a physical law that manifests the vital susceptibility, or power of adaptation of the person to antagonize certain atmospheric or climatic impressions. It is well known that certain races of mankind (it is even supposed some of the lower order of the animal kingdom) appear to enjoy advantages over others in the operation or process of acclimation. Some are very susceptible to morbid impressions, whilst others show a surprising degree of insusceptibility or physical hardihood, in fact almost an entire immunity or exemption from disease. The unknown forces that apparently protect or favor races in certain parts of the world should be better understood. If such advantages are really so favorable, proven by statistical facts, we should in all cases, in the early settlement of new countries, select immigrants the best adapted for the peculiarities of climate.

Material for climatic knowledge in America has ever been abundant, but not rapidly utilized, especially in that immense area, the western half of the continent. Only through military posts, an occasional medical report, through surveys, some casual tourist, or an amateur observer, have we even a smattering of the singular blendings of climate. Since the observations of Dr. Forey, brought down to 1831, all the valuable accumulated material has been chiefly embraced in a volume of great interest, published by Lorin Blodget in 1857. The great growth in population, the cultivation of soil, the explorations of that broad expanse of territory west of the Mississippi since that part of early record, showing so many

interesting variations, are yet almost entirely wanting as material for statistics.

PHYSICAL CLIMATE.—The physical features of a State, the geographical relations of land and water, the general aspect or exposure, are important items in climatology. In the study of climate the general inclinations of a whole country, the aggregate of local exposures, the drainage of the surface, the large number of rivers, bayous, lakes, marshes, and overflowed parts; the prevailing currents of wind; air, journeying under physical laws over the area, are all conditions for investigation. The physical configuration of Arkansas presents great variations of surface. The State is one of the great basin States of the Mississippi, on the west, for a distance of three and a half degrees of latitude, and five degrees of longitude. The elevated parts of the State, commence at the undulations of the surface in the southwestern part, soon developing into foot hills and mountains of the "Masserne range," and expanding into broad mountain tracts as we course toward the north and east, until we meet the "Ozark Mountains," which, commencing near Little Rock, extend north and westerly beyond the limits of the State. They obtain an elevation of from 1500 to 2000 feet. These mountains have been strangely divided into separate ranges. They do not present two distinct chains or divisions. They are simply an intricate blending that belong to the "Ozark group of mountains." In the western division, about the centre of the State, some orological difficulty may be present in placing them all in the same group, from the upheavals, metamorphoses, produced by more recent violent igneous agency that has made physical alterations. The debatable portion of remarkable elevations and manifestations is more especially found in Polk, Pike, Montgomery, and Hot Spring Counties.

MARGINS OF THE GREAT BASIN AND EMBAYMENT.—It is the elevated part of the State, formed by these mountain ranges, that has made, and now makes, the strong physical barrier to the great basin. It also margins the great embayment of the gulf section. It has, physically, geologically, botanically, and climatically, almost completely divided the State. The line drawn as a chorographical division of the State, starting from the southwest, and coursing diagonally to the northeast, as exhibited on the map accompanying


0
5
LONGITUDE 10 E. FROM WABINGTON 15
ABBITIBBE
CANADA EAST
NEW BRUNSWICK
NOVA SCOTIA
MAINE
Augusta
Montpelier
VERMONT
N. HAMPSHIRE
Concord
MASS.
Boston
CONN.
New-Haven
ISLAND
Trenton
NEW JERSEY
ONTARIO
NEW YORK
Albany
PENNSYLVANIA
Harrisburg
Annapolis
MARYLAND
Washington
VIRGINIA
Richmond
NORTH CAROLINA
Raleigh
SOUTH CAROLIN
Columbia
M 50.14 Autumn 1871
63.32 M Average for yr. 1871
M 50.22 Winter 1871
40
35
30

this report, was suggested by geological relations that are plainly presented to view. It separates the older formations from the later, the mineral wealth of the State from the rich agricultural lands, and affords facilities in the investigation of the respective divisions. The rivers of the State, which abound, afford good inland navigation, water power, and drainage course from the north, northwest, or westerly, in a direction south and easterly, to empty into the Mississippi River. The channels of these rivers, the varying temperature of the waters, effects of the evaporation from the surface, give avenues for atmospheric circulation. These water and wind channels are coursed by the cold and more rarefied currents of the air, from the more elevated mountain regions of the north and northwestern territory, which are found plunging into the interior and southern portions of the State, invited thither by the warm air of the littoral regions of the Gulf of Mexico south of us; and this circulation, so refreshing, gives to the inhabitants the marked peculiarities and advantages in the climate of the State. It is well known that a moderately undulating country is, for health, preferable to one altogether mountainous or flat. Mountain regions act physically on the climate of a country, chiefly by determining the prevailing winds; they may also by their direction oppose all wind currents, the passage of salubrious as well as noxious winds, and thus exercise a corresponding influence upon the atmosphere.

PHYSICAL GEOGRAPHY.—The physical features of surface in some parts display marked peculiarities from local surroundings, sometimes from exposure of elevations in the mountainous divisions of the State, so that often within an area of ten miles, we find the temperature varying from 4° to 12° Fahr. It is observable that the Arkansas valley, about Fort Smith, has a peculiarly mild climate, resulting from physical causes, location, surroundings, and the nature of soil. In comparison, a difference of 10° to 15° Fahr. in temperature, is found between that place and one degree of latitude farther north. It is well known that the seasons, between the elevated regions of Washington, Benton, and Boone Counties, in the northwest, compared with those of Chicot, Drew, and other counties in the southeast part of the State, belonging to the alluvian section, show a remarkable difference. At least a month in the advancement of vegetation is plainly

observable in the semi-tropical portion of the southern counties over the northern tier of counties in the State.

We append, from Blodget's Report, the mean temperature of this part of the State, taken at the military post during the period of twelve years. Taking into consideration the contour of Arkansas, viewing it physically as a State, with its marked elevations, declivities, and basin features; the mountain barriers on the west, the altitude of the mountain range in the northern and northwest part of the State, and extending beyond it, in the same direction, we are brought to the conclusion that the low mean of temperature, throughout the year, and the peculiarities of seasons are influenced mainly by their conditions. The pent, walled-up, basin-like collection of air south of the chorographical diagonal line, invites currents from the northern elevated regions, producing condensation of vapors, and a great precipitation throughout the year, with refreshing, eddying currents, freely coursing along the aerial dam which modifies and lowers the temperature of the air at certain seasons, greater than that of adjacent States in the same zone of latitude. Arkansas has been greatly favored by nature in territorial characteristics. Nature has been generous in terrestrial endowments. Man alone has been the sluggard, and neglected the advantages offered him. One of the second tier of Gulf States, belonging to a belt of latitudes the most equal and delightful in temperature found in the grand zone of circumference, upon our planet, in all the known divisions of the earth; Arkansas, "the Switzerland of America," has remarkable conditions, as one of the interior, we might add *middle*, States of the Federal Union. She is abundantly supplied with navigable rivers, so distributed as to give free access interiorly to all parts of the State. The great boundary on the east is formed by the mighty Mississippi. The St. Francis on the northeast, which rises in southeast Missouri, and flows through the low undulated portions of the northeast, where it intermingles with lakes, bayous, and palludal surfaces, is a tributary of the Mississippi. The White River, one of the most charming navigable inland streams on the continent, rises in northwest Arkansas, and, leaving the State boundary, flows through the lower southwest counties of Missouri, soon to return again to the State, to greet its affluent, the Black River, which affords, from the confluence, almost at all seasons, navigation for a distance of three hundred and fifty miles.

White River, with its tributaries, gives drainage for a broad expanse of country from the northwest, middle, and southeastern parts of the northern section of the State.

The Arkansas River, one of the largest tributaries of the Mississippi, rises in the mountains of Colorado, and flows easterly for a distance of two thousand miles to join the Mississippi. White River is an affluent, flowing into it near its mouth. The Arkansas River bisects and drains this vast country; it is navigable entirely across the State; and, during high water, beyond it, far up into the Indian Territory. The Ouachita, with its tributaries, drains almost the entire State lying south of the Arkansas River, or all that surface lying between it and the Red River. It is navigable two hundred and fifty miles. The Red River is the southwestern channel of drainage, and is navigable throughout its course in the State. Thus we have the best avenues to afford drainage throughout all parts of the State. The State is divided into sixty-four counties; forty-six of that number are watered by navigable streams, which, with their branches, afford a navigable highway, within the State, of over three thousand miles, available throughout the year, generally without climatic barriers, for internal commerce. The evaporation from the vast aqueous surface, the condensation and precipitation by rain, plainly demonstrate the peculiarity of climate for the latitudinal position.

CLIMATIC DIVISIONS OF THE STATE.—The climate of Arkansas, north of the chorographical diagonal line, is mild, salubrious, and inviting. Sudden alterations in temperature are less frequent than in the eastern States of the same latitude, the climate being not so changeable as in the lower Gulf States. The prairie, flat, and low lands, south of the line drawn, do not show as high a temperature as some northern States, and the winters are generally short; the mercury rarely falls so low as zero. Within the limits of the State, we find—as the geological map accompanying this report will show—a great variety of mineral in the different tissues of the soil. Vast deposits of valuable minerals are found in the northern division. The rich formations of tertiary and post-tertiary deposits in the lower division are not excelled in fertility by any known land. The bottom lands, we find, vary in quality and productiveness, yet they are generally remarkably deep and rich. Thus

formed by nature, Arkansas is a desirable agricultural and mineral State. Exempt alike from the intense heat of the extreme south and the severe cold of the north, her genial climate and fertile soil produce in abundance the productions of both regions. The rich bottom lands will yield, under favorable culture, from eighty to one hundred bushels of Indian corn, and about four hundred and fifty pounds of cotton per acre, which is considered a fair average crop. The climate and soil with the organic constituents, and moisture requisite, by precipitation of rain, dews, and vapor, to support growth of staple productions, afford an index regarding this subject. The meteorological reports accompanying, showing the mean calculations for each month, at all seasons of the past year, will give an inkling of climatic conditions, at the capital, which is about the geographical and commercial centre of the State. The diversified surface, presenting mountains and valleys, foot hills and plains, table-lands, second bottoms, undulating prairie, rich bottoms, flats, and overflowed sections, gives to particular localities, local atmosphere, notable topography, and singular meteorological influences. The temperature of the seasons, in the different parallels of latitude within the State, greatly differs.

According to Dr. Scoresby Jackson's chart of medical climatology, showing climatic lines, or isothermals, we find Arkansas embraced within the most agreeable latitudes found north of the equator. Between 30° and 40° north latitude is the most desirable belt known throughout North America, Europe, Africa, and Asia. It is the most temperate, equal, and healthful zone of latitude that surrounds the earth. In the precipitation of rain, refreshing showers, dews, and wind currents, Blodget gives the same mean, showing it to be the most favored clime. The precipitation, at all seasons, throughout the year, owing to physical causes, is more equal in amount than found elsewhere in adjacent parallels. The *vernal* mean temperature at Little Rock, Ark., for 1871, was 72° 32′ Fahr. It corresponds isothermally, or as a climatic line, with our continent, between the Atlantic and Pacific Oceans, commencing on the Atlantic coast at a point in Florida (in a parallel with Tampa), a little south of New Smyrna, touching the line at New Orleans, La., the interior of Chihuahua, also, on a line of Fort Yuma (Colorado and Gila Rivers), and terminating on the Pacific coast at San Diego. The *summer mean*, at the capital, for 1871, being the warmest season experienced within the past decade

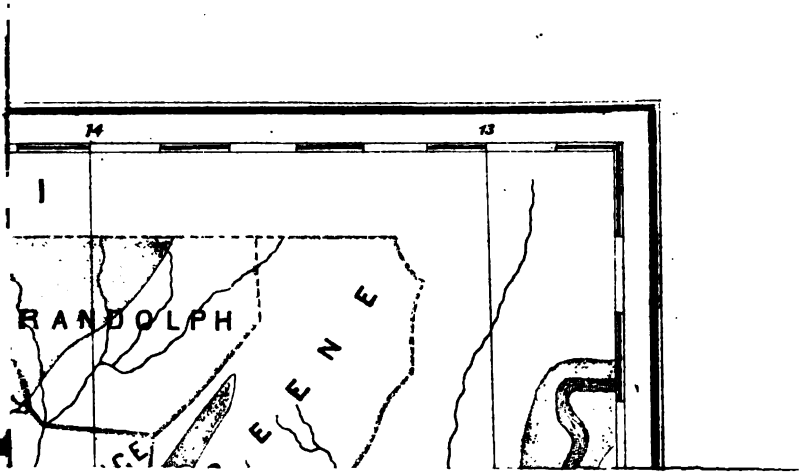
of years, records a temperature of 80° 29′ Fahr., corresponding to the isothermal mean on the Atlantic coast (east), with the north boundary of the Bahama Islands. Littorally, it compares with Charleston, S. C., Wilmington, N. C. In the interior of the continent, with Augusta, Ga., Montgomery, Ala., Jackson, Miss., Fort Towson, I. T., Austin, Tex., El Paso, N. M., passing through the centre of the great basin of the interior to Sacramento, Cal., and Loreto, in L. Cal. Yet we find a climate remarkable for precipitation for the line of temperature. The *autumn mean*, 50° 44′ Fahr., recorded for 1871, at the same place, corresponds, on the Atlantic coast, with a point south of Boston, Mass., internally with New Haven, Conn., Providence, R. I., Pittsburg, Penn., Cleveland, Ohio, Oswego, N. Y., Detroit, Mich., Council Bluffs, Iowa, Fort Laramie, Las Vegas, Albuquerque, Salt Lake City, Fort O'Kmagan, on a line coursing northwesterly, terminating on the Pacific coast at Vancouver's Island. Precipitation, generally, is not very great during the autumnal months. *Winter Mean.* The temperature during the winter varies but slightly from that of autumn. At Little Rock, in 1871, it was only 50° 22′ Fahr., which in isothermal relations, on the Atlantic margin, compares with Charleston, S. C., Savannah, Ga., interiorly with Nachitoches, La., San Antonio, Tex., Fort Tejon—and coursing northerly, terminates on the Pacific coast, at San Francisco. The precipitation is good throughout the winter, with an occasional fall of snow.

The mean temperature of the year 1871, at Little Rock, Ark., is 63° 32′ Fahr. It is difficult to compare this with any record or isothermal relation known. We can only approximate it on the northern division of the hemisphere. On the Asiatic Pacific coast, the mean compares with the temperature of southern Japan. It courses Asia, running south of a parallel with Constantinople, again, on a line with Rome, easterly, a little south of Madrid (Spain), ranging about the temperature of the Azore Islands, touching the Atlantic coast of America about Charleston, S. C. It makes a good interior line, in regular parallel, west, running south of El Paso, and onward, northwesterly, to the Pacific coast of America about San Francisco. The hyetic relations are among the best to be found in the United States, and are regarded as the most desirable mean that belongs to the hemispheres.

GEOLOGY.—The geology of Arkansas in the various sections of

the State is as varied as the climate. The geological map accompanying this report describes the various formations containing rich deposits of valuable mineral, coal, lignite, marls, and other marine deposits. North of the chorographical division we have a delightful climate. The mountains, table-lands and valleys present, generally, a rich surface, good drainage, romantic and picturesque scenery, and a productiveness remarkable for the formations and latitudes. The staple productions of that part of the State are more allied to those of the States of Missouri, Tennessee, and Kentucky. South of the diagonal line, we find geological formations peculiar to the embayment of the Mississippi. It belongs to the drifts and deposits of the tertiary and post-tertiary periods. The formations belong to cretaceous, eocene tertiary, post eocene, and quarternary chiefly. It is not proper in this report to delve too deeply into geology, or attempt to discuss chronologically the various formations. Our purpose is merely to allude to the nature of the expanse found in the area of the State, to give the exposure, surface, character of underlying rocks, mineral deposits, drainage of country and such material that may afford a foundation of perpetual climatic value. A rich mineral belt of lead can be traced from the southwest corner of the State following the north division, bordering the northern portion of the line, and extending northeast to Pulaski County, perhaps beyond it (running from the "Bellah mines," on the margin of the State, to the "Kellogg mines"), varying in width, depth and value of the ore. Galena is also found abundantly in the northwestern part of the State, and extends southeast through several counties; zinc and manganese are also found near the southern margin of the Silurian formations. Iron abounds throughout the State, and, with the valuable coal measures, will be of future commercial importance. The vast deposit of lead ore found in this State is generally argentiferous galena. Along the diagonal line, marine beds are found quite liberally distributed, interspersed among the clays, alongside of the lignitic belt that runs almost parallel with the galena.

The marine deposits are found coursing from the Mississippi border of the State (in Crittenden County) southwesterly in direction to the Red River. In Little River, Hempstead, Clark, and the adjacent counties, they are found more superficial and apparently more abundant. These marine beds appear mostly as outliers on the cretaceous deposits developed in the southwestern part


14
13
RANDOLPH

of the State. Geologists complain of a paucity of the vestiges of ancient life in the formation of the different groups, carboniferous, etc., found within the State. It suggests that the alterations of surface by elevation—uprising, or upheaval according to Hilgard, or the sudden retirement of the waters of the gulf, from the mountain barriers and slopes of this part of the great embayment, at an early period, and the rapid deposits of the tertiary and quarternary formations, may account for the apparent scarcity.

Palæozoic and palæo-botanical vestiges are not of sufficient interest to dwell upon in sectional climatology. The "grand prairie," lying between the Arkansas and White Rivers, presents an elevated surface of table-land which is peculiar in soil, and an exception to the general productiveness of almost all other parts of the State. The surface appears a good retainer, but it requires organic matter, deep culture and exposure of the soil. If supplied with organic food, nature will soon reward the husbandman with a bounty. The palludal region that borders the shore line of the Mississippi River, from Mississippi County in different parts, to Chicot County, presents a large tract of surface that would prove immensely valuable by drainage. The overflowed bottoms are districts where pernicious climatic diseases usually prevail during the warm season. The productions of the basin section of the State are very valuable. The rich alluvial bottoms of this part produce the valuable staples of the Southern States, together with the fruits, vegetation (especially the flora), of the semi-tropical latitudes.

BOTANY.—The division line drawn on the map of Arkansas separates the mountains, foot hills, and undulating parts almost entirely from the level lands of the State, and gives a marked difference in the botany of the parts, recording the evidence by the varying staple productions, and luxuriance in vegetation, from the monarchs of the forest to the tiny cryptogams.

A knowledge of climate, and the conditions afforded by it for the advantages of animal life, are thus clearly indicated. A list of the botanical productions of the State, taken from *Owen's Geological Reconnoissance*, will be appended to this report.

HYGIENE.—We find variety in temperature, humidity, and all meteorological conditions within the boundary of our State. The

chorographical line designated, also marks a climate line north of it. The cheerful, romantic, invigorating atmosphere of the mountain regions, with its clear bright skies, affords an inviting tonic climate, especially for those suffering with chronic affections of the respiratory organs, digestive forces, or general physical debility. The more equal sedative climate of the southern division of the State is also well suited for diseases of the mucous surface. The temperature, although relaxing during the hot months, is generally genial. The vicissitudes, or sudden transitions, however, are less frequent than we find in the adjacent States. In the lower tier of counties, particularly where the pine in dense forests abounds, a good atmosphere can be found for those chronic sufferers who are afflicted with catarrhal, bronchial, or pulmonary affections. In the low lands, in the various parts of the State, where a rank and luxuriant vegetable growth is general, will be found those types of malarial diseases which characterize such regions elsewhere. The inhabitants living adjacent to palludal sections, or residing in the rich alluvial and post tertiary parts, suffer from miasma, which produces vernal, æstival, and autumnal climatic ills. Intermittent and remittent fevers are common, and visceral disturbances a consequent; malarial hepatic, malarial splenic, malarial renal, malarial pulmonic, malarial gastric, malarial enteric, malarial cerebral, spinal, and nervous derangements prevail. Cerebro-spinal meningitis, hæmic glandular disturbances, pneumonia, hematuria, hæmatemesis, morbus Addisonii, gastro-intestinal disease, rheumatism, neuralgia, all belong to that class of diseases most generally due to atmospheric impregnations.

Arkansas is abundantly supplied with pure delicious water. Her numerous rivers, springs, and clear streams flowing from mountain tributaries, supply the inhabitants with a superabundance. The number of valuable mineral springs throughout the State is inviting to health and pleasure seekers, and, with the climatic advantages, if rendered accessible to visitors, would, throughout the year, make much of the State a sanitarium.

THE HOT SPRINGS OF ARKANSAS.—The Hot Springs of Arkansas, in the interior of the State, are among the wonders of the continent. These springs, fifty-seven in number, ranging in temperature from 93° to 150° Fahr., discharge over 500,000 gallons

of water daily, sufficient in quantity to accommodate (with delightful bathing) 10,000 bathers every day in the year. These natural earth-heated waters hold in solution valuable mineral constituents. Clear, tasteless, inodorous, these springs pour forth, from the novaculite ridge, waters as pure, bright, and sparkling as the pellucid Neva. The various springs are qualitatively allied, not holding in solution or freighted with too much abusive mineral, and they are free from all noxious gases. It is believed the properties of the waters, especially in the treatment of chronic hæmic diseases, are unequalled. There are no springs known of superior value, or that can compare with the Hot Springs of Arkansas, as adjuncts in the treatment of that class of chronic diseases. They are more nearly allied to Gastein (in the Noric Alps) than any known springs; but, in regard to climatic advantages, we can justly claim that the climate of Arkansas, throughout the year, far surpasses the European. When hydrotherapy is more generally understood by the medical profession at large, these natural waters, as remedial adjuncts, will surely be more appreciated for the virtues they possess. These thermal springs do not belong to that class known as intermittent waters. They flow a constant regular current with like temperature. Arising from great depth, the calidity, or gelidness exteriorly, does not appear to influence them. Many theories exist regarding the cause of heat of all such constant springs. We must incline to the views of Humboldt, that it is imparted by the inherent heat of the earth. These superheated waters and gases, with the high electrical conditions (as we find, artificially or naturally generated, whenever the temperature is elevated to a certain altitude above ebullition), hold in solution the soluble mineral tissues of the earth, through which the hot water penetrates, and convey it to the surface. The crude materials found by qualitative analyses in these waters are—

Silicates with base.	Alumina, with oxide of iron.
Bicarbonate of lime.	Oxide of manganese.
Bicarbonate of magnesia.	Sulphate of lime.
Carbonate of soda.	Arseniate of lime?
Carbonate of potassa.	Arseniate of iron?
Carbonate of lithia.	Bromine?
Sulphate of magnesia.	Iodine, a trace.
Chloride of magnesia.	Organic matter, a trace.

The pure, subtile liquid certainly holds in refinement active mineral ingredients, that no chemical analysis can resolve satisfac-

torily its true natural combinations, or reveal the relations. The inherent thermo-electric properties, together with the peculiar chemical formations of the carbonates of the alkalies, alkaline earths, and other mineral substances, give the waters properties that cannot be imitated by art. Their action is strangely unlike artificially prepared waters. Who would sip, gulp, or quaff down three or four pints of artificially prepared water, at a temperature of 148° or 150° Fahr., at one time, and feel refreshed after the feat? Here it is given to invalids, as the usual dose, during the process of bathing. The efficacy of this wonderful fluid, medicated mysteriously in subterranean recesses, by its affinities, or powerful combining forces, is really a subject worthy of more general study, and of true professional interest. As "correlants," "alterants," and "eliminants," these waters are important adjuncts that will aid the practitioner with celerity to control many obstinate chronic ills. When projected railroads are completed, affording greater facilities for travel, this miniature Baden Baden will be an invalid's resort throughout the year. We predict that the period is not remote, when these springs will be more famous, and resorted to annually by European tourists for all chronic hæmic diseases.

The Mammoth Spring, in Fulton County, is also a remarkable phenomenon. The main body of water issues from a cavernous orifice forty yards in circumference. A volume of water flows, constant in temperature of 60° Fahr., and in quantity estimated at eight thousand barrels per minute. This water, doubtless, has some subterranean origin that courses beneath the silurian formations. The surface of the water is continually agitated by the bubbling action of the carbonic acid which impregnates it. The highly charged gaseous water favors the development of aquatic plants, which attract water fowls during the cold months. No great value is attached to the medicinal properties of the Mammoth Spring waters, but it is here noted as a matter of scientific interest. It is a valuable hydraulic power for manufacturing purposes.

DISEASES, ETC.—When your Committee on Climatology, etc., for this State was appointed, correspondence soon commenced with a number of intelligent medical gentlemen residing in different parts of the State, soliciting their aid in the effort to procure the best material for a report. They were invited to furnish, for record, a knowledge of the past, supply vital statistics, report epidemics,

endemics, nature of sporadic diseases, peculiarities in type belonging to their respective locations; in brief, to present all important climatic facts known to them in their region, in order to consummate the work. Special attention was directed to certain localities, seeking information based upon the physical geography, geological formation, nature of soil, and meteorological conditions. Several respected friends promptly responded to the call, giving interesting data for future use, which were thankfully received, and will be referred to in the course of this paper with a degree of satisfaction. It is unfeignedly a matter of profound regret that more valuable statistics cannot be added. With few pleasing exceptions we can furnish very few statistics worthy of record. Application was made, also, to note particularly the effects of climate, and the supposed immunity, or otherwise, of the different races, concerning diseases of a peculiar type. It was desirable, if possible, to have the experience of your committee confirmed in the conclusions concerning the several diseases mentioned. It is allowed, and has been noted by your committee, that croup, diphtheria, influenza, ozæna, and *delirium tremens* are rarely found among the pure-bred African race in this climate; that syphilis and gonorrhœa are more tractable with that race; also that integumentary (positive electrical phases) as well as mucous ills (negative electrical phases) are less persistent and infrequent among Africans. Phthisis pulmonalis, typhoid fever, gout, and rheumatism, with their complications, are less frequent in Arkansas than found in the adjacent States. Although phthisis pulmonalis rarely originates here, yet it is proper to qualify the last expression regarding the rarity and comparison with the State of Texas. Doubtless southwestern, middle, and northwestern Texas affords a climate equally favorable to combat that disease as this State; but each State merits the attention of medical men—for those who have hereditary predispositions, or are threatened with respiratory diseases of that class. The appended replies of the gentlemen who were interrogated for special information, will give an idea of the questions asked concerning the subject. All feel and deplore the want of vital statistics.

The recent organization of local medical societies, and of a State Medical Association, in this State, will tend to impart valuable information concerning the nature of diseases, climatic and meteorological influences, if the duties of the respective bodies are

properly directed for scientific accomplishment. We add a list of the local societies reported organized at the last session of the State Medical Association.

NATURE OF DISEASES, ETC.—Dr. P. O. Hooper, of Little Rock, Arkansas, late President of the State Medical Association, etc., under date of April 4, 1870, informs your committee: "*We have never had an epidemic of any kind in Little Rock.* All eruptive fevers are of a mild and tractable type. Have had but few cases of pneumonia for two years. Pneumonia is frequently complicated with typhoid symptoms; also bilious or remittent fevers with the same complications. Do not believe I ever saw one well-marked idiopathic case of typhoid fever, the disease only occurring or following other fevers. Phthisis pulmonalis is rare. Don't recollect now of ever seeing a case of phthisis in this section that originated here unless from hereditary succession. Skin diseases are not common; uterine ills infrequent; scrofula rare; ozæna rare. Rheumatism, the last season, quite frequent, very tenacious, and difficult to overcome. Seldom any heart complications. Previous to last year rheumatism was seldom known here. Dysentery quite frequent during dry summers and fall, but seldom fatal. No statistics or mortuary reports kept by city. Consider Little Rock, Arkansas, more healthy than any town in the United States of equal and mixed population." In reply to further inquiries, Dr. Hooper, under date of February 7, 1872, writes: "In all my practice I have never seen an epidemic of any kind. Nothing *epidemic* prevails in this place. Sporadic cases of contagious diseases are rare. I believe, immediately after the war, cholera prevailed here among the soldiers and freedmen, but I saw none. Even pneumonia is infrequent during the present winter. I have had but *three* cases, and have heard of but few other cases in the city for six months past." In February, 1872, it was reported that "cerebro-spinal meningitis" was prevailing, and that three deaths had occurred among the students at St. John's College, at Little Rock, Arkansas. Your committee at once made inquiry concerning it. In reply, under date of February 21, 1872, Dr. P. O. Hooper, chairman of the committee appointed by the trustees of St. John's College to investigate the cause, furnished the report of the committee in relation to it. We extract the following: "The disease was known to prevail in St. John's College in the years 1862 and 1863, when occupied as a hospital by the C. S. Army. The Hospital Steward

at that time, Mr. H. C. Burrows, now residing in this vicinity, states that there occurred not less than one hundred cases of cerebro-spinal meningitis, a large majority of which died. The cistern water used by the cadets for drinking purposes has been examined, and found to contain organic matter. Hopital Steward Burrows further states that Confederate surgeons had to discontinue the use of this cistern water, from its supposed injurious influences." The communication from Dr. R. G. Jennings, late A. A. Surgeon, U. S. Army, corroborates the same statement. The committee, in reply to the interrogatories of the trustees, add: "We are of the opinion that there exists some local cause or causes that have excited this outbreak," and they suggest the following, viz.: "We recommend that the interior of the building be saturated with freshly manufactured chlorine gas; that the walls be thoroughly whitewashed or calciumized, either preparation of lime to contain a small amount of carbolic acid. That the woodwork be re-painted; floors cleaned with water impregnated with concentrated lye, and afterwards painted. The remnants of matting, now on the floors, should be removed and burned; unslaked lime, or other disinfectants, should be freely used around and about the building, and all cess-pits should be covered with earth. We also recommend the closing of the cistern, and that new ones be built; and that, for the present, all water for drinking purposes should be obtained from sources where it is known to be of pure quality." Attention to these suggestions, the daily inspection from the culinary department to the dormitories, the free circulation of pure fresh air, together with a thorough system of sanitary police, soon arrested the disease in that college.

In a few weeks after its subsidence at St. John's College, the disease occurred in a few sporadic cases among the citizens of Little Rock, Arkansas. It proved fatal in almost every case. Cerebro-spinal meningitis appeared also at Helena and Lewisburg, Arkansas, and a few sporadic cases were reported along the Arkansas River, but the type of it was less malignant. At Helena it attacked all ages, from childhood to advanced years.

The contribution to this report, from Dr. Hooper, speaks for the interior of the State; Little Rock (his birth-place) being the capital, and about the geographical centre.

Dr. R. G. Jennings, of Little Rock, read before the Arkansas Medical Association, November 6, 1872, "A Sanitary Survey of Little Rock," which is a valuable paper, and merits attention, as

Little Rock is now attracting the attention of capitalists and others from abroad, as a desirable location for residence, and for its commercial advantages. We append the following extract from Dr. Jennings's report:—

The city supply of water is altogether from artificial wells and cisterns, and is of a fair, healthy quality, in no case deleterious, and, in very many, excellent. Thus a sanitary survey of our situation and surroundings, although we are usually considered as located in a malarious district, discloses no prominent causes for endemic or epidemic influences.

Prior to the war it was considered a remarkably healthy and desirable place of residence, and, within the memory of the oldest physician, had never been visited by either of those scourges of the human race—cholera or yellow fever.

During the war and occupancy by Confederate and Federal armies, respectively, particularly of the latter, the amount of sickness, both among soldiers and citizens, was undeniably appalling. Disease, then, seemed intensified, and proved alarmingly fatal among freedmen, women and children, and white refugees.

This, however, could, in a great measure, be accounted for by causes referable strictly to unfavorable sanitary conditions; such, for example, as the crowding together of a large number of persons in one house, cabin, or tent; the inferior quality of their food; the improper preparation of it; their irregular and gluttonly manner of partaking it—usually "bolting" rather than masticating it; the want of necessary and proper clothing, etc.; the unusual exposure to cold and moisture; the constant excitement of mind; in fact all these exerted an influence favorable to the development of disease.

Throughout the summer of 1866, there was a great amount of sickness, and, in addition to our endemic diseases, cholera supervened, and prevailed quite extensively among soldiers and citizens.

It first appeared among some new recruits stationed at the United States Arsenal, who had passed through infected places on their way to this post. There had, however, prior to the appearance of cholera, been observed a marked tendency to diarrhœas, dysenteries, cholera morbus, and other kindred bowel affections; so that remedial agents of a cathartic or even laxative nature, when prescribed, exerted such a powerful effect upon the patient that their use had become extremely limited. Cholera was also known to prevail this season in almost every city along the Mississippi River.

It is impossible to arrive at any positive conclusion regarding the fatality of the disease among the citizens, as there exist no proper records from which an accurate estimate could be made. From the number I personally attended, and from the number which other physicians have informed me they observed, I then approximated the number of deaths from this disease among both white and colored, at one hundred and sixty-five; this, from a population of between eight and nine thousand persons.

From the commencement of the year 1867 until the present time (November, 1871) the health of the city has been unusually good. In this period there has not prevailed any distinct type of endemic or epidemic disease of sufficient virulence or fatality to cause anxiety of mind among any class of persons. Unfortunately there has not been, until recently, any record of diseases or causes of death, or other authentic evidences or data, from which accurate information could be obtained sufficient to enable the physician to draw conclusions. The Pulaski County Medical Society first brought before the city council the subject of the registration of all deaths, and the cases producing the same.

This body, appreciating the necessity of accurate information for statistical and sanitary purposes, passed an ordinance regulating the burial of the dead, etc., which ordinance became a law on the 31st day of March last.

This ordinance requires, as a condition precedent to the issuance of a burial permit, a certificate from a physician, stating the name, age, sex, color, nativity, social relation, place of residence, duration of last illness, disease or cause of death, and place of intended interment. This law has now, November 1st, 1871, been in force seven months; and I find, upon careful and accurate enumeration, that 268 deaths have been recorded: white males 98, white females 59, colored males 66, colored females 45. Included in the number of deaths (268), are stillborn white children 9, and stillborn colored children 20.

Number of deaths of white children five years of age and under, 48. Number of deaths of colored children five years of age and under, 47. Number of permits issued for interments of persons whose residence and death were outside the city and immediate vicinity, 47 (these being also included in the whole number enumerated, viz., 268).

Deducting these latter, we have, in a period of seven months, 221 deaths proper, in the city, from a population of seventeen

thousand. An average of a fraction over 31 per month, or a fraction over one death each day.

As there is no registration of births it is impossible to make an estimate of the number, or to compare the ratio of deaths with that of births.

And, as we have no authorized classification of diseases or causes of death, I have hastily improvised one, and arranged the list of diseases and causes, as best I could, in view of the imperfect manner in which the certificates have been made out. The arrangement is as follows:—

Class I.	
Miasmatic diseases	88
Enthetic diseases	1
Dietetic diseases	6
Class II.	
Diathetic diseases	5
Tuberoular diseases	34
Class III.	
Diseases of the nervous system	34
" " throat, lungs, and heart	24
Hepatic, venal, and digestive diseases	21
Diseases of the bones	1
Wounds, injuries, and accidents	12
Unclassified, including stillborn	37

It will be observed that there is no unusual proportion of any one distinct cause of disease.

That the greatest number of deaths (95) in Class I. was—from miasmatic causes 88, enthetic 1, dietetic 6, of which there were twenty-one cases of congestive fever, and cases reported as congestion.

That the next largest number in Class I. (15) was from remittent fever, while the third in progression (12) was from chronic diarrhœa. These all come under the order of miasmatic diseases.

Under the order of dietetic diseases in Class I., there were 4 cases of death from intemperance, and one from *delirium tremens*, making 5 in all, an unusual proportion of deaths from this cause; a fact somewhat suggestive, irrespective of any question of morality, as regards the quality of liquors generally sold in our city.

In Class II. we find 39 deaths; from diathetic causes 5, tubercular 34. Thus we have 31 cases of death from consumption, a very large percentage, considering the season of the year. Of these, 13

were of white persons, and 18 of colored. This exhibits the fact that consumption is making rapid strides among the latter-named race of people.

In Class III. there are 134 deaths; of inflammation of the brain we find 13 cases. Also 10 cases of cynanche trachealis or croup. The former as well as the latter cases, in this class of local diseases, appeared chiefly among children.

From wounds, injuries, and accidents, we have 12 deaths, a *very* large mortality indeed. Of this number, 5 were killed or died from wounds inflicted by other persons; 2 were drowned; 2 burned sufficient to cause death; 2 died from amputation of leg, after injury, and 1 committed suicide by taking strychnine.

Dr. E. R. Duval, of Fort Smith, Arkansas, writes under date of March 5th, 1870: "The data of medical history in this part of Arkansas are exceedingly meagre and unsatisfactory. Would that there was a well-organized medical society in each county in the State; also a State organization, awake to the best interests of the profession." Under date of March 27th, 1870, in reply to further inquiries, he states: "Influenza has not been frequent in this State, although for the past two months an epidemic has been general throughout this and Scott counties—form mild. Ozæna is very rare. I've never seen a case of croup in the pure-bred African. I've found syphilis very manageable, more so, by far, than in the white race. The same fact might be stated in reference to gonorrhœa in the African. I've never seen a case of *delirium tremens* in the negro. Such is also the observation of Dr. Dunlap, who has practised medicine and surgery upon this frontier for many years. The Indians, west, in their diseases, present nothing peculiar, save much less resistance, and great proneness to "passive congestions," particularly of the lungs. There has been, for sixty days, an epidemic of tonsillitis in this city. Latitude of Fort Smith 35° 23′ north; longitude 94° 29′ east."

Your committee is further indebted to the accomplished gentleman for the following report of the diseases, etc., of the north-western section of the State:—

"The climate of this and contiguous counties is *temperate*. The summer season is distinguished by no exalted degree of heat. The thermometer exhibits, from the first of June, a temperature varying fron 85° to 96° Fahr., until the 20th of August. For a few days in July, particularly during a season of drought, the mercury may rise as high as 100° Fahr. About the 20th of

August the nights begin to grow cool, and no heat worthy of record during the day, save at about noon. Gradually, as September approaches, the heat gives away, or disappears, and by the 20th of September the fall has commenced, which, in this latitude, is gratefully acknowledged, as it is marked by no sudden changes, but, on the contrary, is cool and bracing. About the 20th of November, almost invariably, there is a 'cold spell,' lasting about ten days, when it again moderates to usual fall weather, and winter is not clearly announced until the 20th of December. At this time, and for a week, the thermometer indicates a temperature varying from 20° to 32° Fahr. The residue of the winter presents no excess of cold—a temperature varying from 32° to 44° Fahr. The present winter has been a very mild one, and quite dry. Our spring commences after Easter, usually about the 15th of April. I am unable to furnish classified tables, as I have neither barometer, thermometer, nor hygrometer.

"The physical geography of the country presents much diversity. The carboniferous area, in this county especially, is very large and fertile; the product is rich and abundant, not only for home consumption, but also (if transportation could be secured), for exportation. Of diseases, those of a malarial origin are by far the most prevalent. Intermittents assume every type; the tertian, however, is the most common. No season is exempt. Most prevalent from the 1st of June to the 1st of October; usually yielding to the antiperiodic, quinia. My experience in the treatment of the disease leads me to regard no treatment satisfactory unless patients are removed from the malarial districts; then, by systematic and persistent effort the paroxysms may be controlled. All diseases here exhibit decided periodic exacerbations, demanding, sooner or later, antiperiodic treatment. Cholera prevailed at Forts Smith and Gibson in 1832, 1849, 1851, 1866, and 1867. The epidemics of 1832, 1849, and 1851 were *very fatal.*

"One remarkable fact in reference to the cholera, in its manifestations here, is that it has never visited Van Buren, Crawford County, Arkansas, a small town on the north side, five miles northeast of Fort Smith. It is true a few sporadic cases occurred, but in no way did it spread among the inhabitants. This is the more remarkable when it is known that no quarantine regulations interdicted the free intercourse of the citizens of the two places. We have never had yellow fever. Dysentery is not common. In

1853–4 a fatal epidemic prevailed in Washington, Benton, Madison, and Carroll counties. The type was adynamic, and was equally fatal in young and old. Typhoid fever, pure and uncomplicated, is rarely seen. Pneumonia is common in the winter, and often assumes a typhoid type. Phthisis is rare. Of the 'exanthemata,' we have had epidemics of scarlatina, rubeola, and variola.

"In 1846–7 scarlatina raged as an epidemic through this and adjoining counties. It appeared again in 1863–4, but without malignancy. Rubeola has often visited us. In 1869 it was very general in its manifestations, yet mild and easily managed. Variola has often occurred sporadically; in 1859–60 it assumed an epidemic character, and, out of five hundred cases in this city, ten per cent., at least, died. Of the eruptive diseases, the following of the chronic class are most common, viz.: urticaria, eczema, and prurigo. They are generally very readily controlled. A form of prurigo, known with us as 'army itch,' has prevailed since the war, and, in the majority of cases, has been very persistent, defying in some the very best and most skilful treatment. Of the neuroses, neuralgia of the fifth pair or trifacial nerve is the most common; indeed, it is *very general.* Females are very prone to it, and no treatment can be regarded as curative—palliation, in most cases, alone being possible. The latter remark is not intended to embrace those cases clearly of malarial origin. Of uterine diseases, the most common is chronic cervical endometritis, and from my limited observation I am led to believe no treatment satisfactory without perfect physiological rest.

"I now close, expressing regret at my failure to give you anything satisfactory; still, my dear sir, if I dared offer anything by way of extenuation, I might, even with such a critic as you, be justified."

Since the date of Dr. Duval's report (March 6th, 1870), he has assisted in the organization of a State Medical Association, taken part in the proceedings, and met delegates from *nine local or county medical societies* at the last session. At the last meeting of the State Association he contributed an article on "Malarial Hematuria," which is published in the Proceedings.

Dr. J. A. Owens, of Monticello, kindly supplied your committee with valuable information relating to the medical topography, climate, and diseases of southeastern Arkansas. Under date of January, 1871, he writes: "I will include, in the short report, the

counties of Drew, Ashley, Desha, and Chicot, situated in the extreme southeast corner of the State, and comprising all the territory between the Mississippi River on the east, and the Saline River on the west, and extending from the Arkansas River (near its mouth) north, to the Louisiana line south, latitude from about 32° to 34° north. The counties of Desha and Chicot are situated exclusively in *the swamp*, or valley of the Mississippi. This valley or swamp has an average width here of from twenty-five to thirty miles, and is intersected with numerous lakes, sloughs, and bayous. The higher lands are the banks of the river and of the larger bayous, and constitute, with few exceptions, the only habitable portion of this section of the country. In consequence of the destruction of levees during the late war, which were built for the protection of this region, it is subject to annual inundation during the March and June freshets of the Mississippi and its tributaries. The banks of these streams form, as a general rule, the highest part of the immediate country through which they pass, so that when the rivers fall, after an overflow, a large surface of land is left undrained, and a large amount of water is left to be carried off by percolation and evaporation during the summer. About ten or fifteen miles west of the Mississippi River, however, there is a large extent of swamp country which remains unaffected by the overflow of the river. This section is intersected by numerous ponds, sloughs, and lakes, which, having no outlet, are filled with water during the winter and spring rains, and are consequently subjected to the same influences as the overflowed region. Near the junction of this vast swamp with the higher lands of Drew and Ashley counties, meanders the 'Bayou Bartholomew,' a stream of considerable importance in an agricultural point of view. The lands on either bank are high, and entirely above overflow, and have a gradual descent for the distance of a half mile to one mile on either side, and are consequently well drained. The soil is a rich alluvium, and very productive. Its banks are dotted with numerous and extensive plantations. Still, thousands of acres of these magnificent lands are in their wild or virgin state, awaiting the axe and plow of the sturdy pioneer to develop their resources, and make this one of the finest cotton regions of the State. This stream is navigable during the spring rise, for small boats, some three hundred miles above its junction with the Ouachita River. As might be expected, the inhabitants of this swamp, and of the hills in its

immediate vicinity, are subject to *malarial fevers* of every type, variety, and grade.

"Leaving the swamp, which terminates abruptly in an irregular line of bluffs or hills, with an elevation of fifty or seventy-five feet above the valley, we come next to the high lands of Drew and Ashley counties. For a distance of ten or fifteen miles west of the valley, the country is comparatively level, with a gradual elevation towards the centre of Drew County, where it swells into a broken mountain ridge, with an elevation of one hundred and fifty to two hundred feet above the valley of the Mississippi. This ridge runs through the centre of Drew County, from north to south, and abounds with numerous springs of pure, soft water. Monticello, the county town of Drew County, is situated on this ridge, within forty miles of the Mississippi River, and about midway between the swamp or Mississippi Valley and the Saline River, and at the junction of the M. O. and R. R. Railroad with the L. R., P. B., and N. O. Railroad. The former road is nearly completed to this point; the latter is in process of construction. Monticello has a population of 1500 or 2000 inhabitants, and is rapidly improving.

"Westward of this dividing ridge to the Saline River, and south through Ashley County, the country is less elevated and more level, and covered with a thick growth of magnificent pine timber. There are quite a number of prairies in Ashley County. The soil of this upland or hill country is argillaceous, covered with a thick vegetable mould. That of the bottom lands, on the numerous creeks which intersect this region, is partly alluvial, and very productive. The principal productions are cotton, corn, wheat, oats, potatoes, and tobacco.

"Culinary vegetables, of almost every variety, and of superior quality, are raised in abundance. Various kinds of fruit, as the apple, peach, pear, plum, nectarine, fig, pomegranate, etc., are very abundant, and attain a large growth, and are finely flavored.

"The forest trees consist principally of the genus quercus, pinus, carya, juglans, dyospyros, populus lævigata, prunus Virginiana, ulmus fulva, et rubra, cornus Florida, and cupressus disticha.

"FLORA, FAUNA, ETC.—The following are a few of the plants of this region: Datura stramonium, azalia nudicalis, podophyllum peltatum, arum tryphyllum, allium sativum, aristolochia serpentaria, chenopodium anthelminticum, phytolacca decandra, rubus villosus, rubus trivialis, vitis vulpina, vitis labrusca, rhus toxicodendron, gelsemium sempervirens, marrubium vulgare, mentha

piperita, mentha viridis, asclepias tuberosa, helianthus annuus, tanacetum vulgare.

"The animals of this region, as in other parts of the State, are: the black bear, deer, panther, wild-cat, fox (red), rabbit, raccoon, opossum, skunk, mink, wolf, otter, beaver, squirrel (red, gray, and black), rat, and mouse.

"The birds are: the wild turkey (meleagris gallipavo), turkey buzzard (cathartes aura), bald eagle (falco leucocephalus), owl (strix Virginiana), meadow lark (alauda magna), blackbird (quisculus versicolor), crow (corvus Americanus), blue jay (cyanurus crystatus), thrush (terdus rufus), robin (terdus migratorius), blue-bird (sialis Wilsonii), snow-bird (emberiza nivalis), woodpecker (picus auratus), kingfisher (alcedo alcyon), swallow (rufa hordeorum), whip-poor-will (caprimulgus vociferus), pigeon (columba migratorius), partridge (ortyx Virginianus), red-bird (tanagra æstiva), mocking-bird (mimus polyglottus), snipe (scolopax Wilsonii), woodcock (scolopax rusticola). The wild goose (anser Canad.), and several species of the duck, as the anas brochas and anas sponsa, frequent the watercourses of this region during the winter.

"The rattlesnake, small ground rattlesnake, moccasin, cotton-mouth, viper, copperhead, blacksnake, chicken snake, king snake, and others, are quite numerous in the swamps, but are seldom seen in the hills.

"Among the insects, I will mention the honey-bee, humble-bee, yellow-jacket, hornet, wasp, cricket, grasshopper, butterfly, house-fly, horse-fly, ant, flea, tick, gnat, mosquito, and sand-fly. The three last mentioned are confined almost exclusively to the swamps and low lands, and are never troublesome on the Monticello Ridge.

"The rivers, lakes, and creeks are abundantly supplied with fish of a superior quality. The principal varieties are the buffalo, cat, trout, bass, pike, perch, white perch, gar, drum, and sucker.

"The geology of this region presents an unexplored field for scientific research. I will remark, however, that beds of coal have been discovered on the Saline River, in the counties of Drew and Bradley, but they have not been sufficiently investigated to ascertain their quality or extent.

"The climate is mild and equable, the thermometer rarely going above 90°, or below 20° Fahr.

"DISEASES.—The majority of the diseases of this district, and especially those of the summer and fall months, are of malarial

origin; and those which chiefly engage the attention of the physician are fevers of an intermittent and remittent type. In the counties of Desha and Chicot, situated as they are in the low, alluvial lands of the Mississippi Swamp, these fevers prevail extensively, and are generally of a very *severe* grade. In fact, they are so common in this region that an individual who resides here one season and escapes unscathed, is looked upon as very fortunate indeed. The inhabitants of this swamp, with very few exceptions, exhibit, in their general appearance, the peculiar characteristics of malarial toxæmia, such as the pale, sallow complexion, protuberant abdomen, from enlarged liver and spleen, and general depression of the physical and mental energies; so that, as a general rule, it is only necessary to see an individual to be able to tell in what portion of the country he resides.

"As the hill counties of Drew and Ashley lie due west of the Mississippi Swamp, or palludal district proper, and the prevailing winds of summer are from the southwest, the miasmatic exhalations of that region are not so fully experienced here; consequently the fevers are not near so common, and are generally of a milder grade. In the treatment of the miasmatic fevers of this region, mercurial cathartics, quinine, and the various preparations of cinchona, are mainly relied on. Quinine is usually given in the intermission or remission of the fever; but in those severe cases of fever where the remission is not well marked, we do not hesitate to give it during the fever, combining it, in those cases, with veratrum viride, or some one of the special sedatives.

"A very malignant form of malarial fever has prevailed to a limited extent in the swamps of this district, and on the hills in their immediate vicinity, characterized by a deep-yellow or jaundiced condition of the skin, excessive irritability of the stomach, and hæmaturia, and attended with remissions and exacerbations. This disease is peculiar to the South, and generally follows repeated attacks of intermittent fever. So much has been written and published by physicians of the South, during the last three years, in regard to the history, nature, and treatment of this disease, and by those too who have made it their study at the bedside, that I will merely allude to it in this connection. Each writer on the subject has given it a name to suit his own peculiar views of the pathology of the disease. The name "hæmorrhagic malarial fever," suggested by Dr. Michel, of Montgomery, Alabama,

appears to be most generally adopted by the profession at present. I will remark that I have never met with a well-marked case of this disease in Monticello or vicinity; nor have I heard of a case occurring on the Monticello Ridge, in this county. My brother, Dr. J. M. Owens, of Hamburg, informs me that he has met with a number of cases of this disease in Ashley County, and that they have generally terminated fatally. During the winter and spring, diseases of the respiratory organs, as catarrh, laryngitis, bronchitis, pneumonia, and pleuritis, are most prevalent. As a general rule they are of a mild grade, and yield readily to treatment.

"Previous to the late war this portion of the State was subject to occasional visitations of epidemics of typhoid fever, dysentery, and typhoid pneumonia. Since 1860, however, with the exception of the almost universal prevalence of measles and hooping-cough in 1869, there is no disease which can be said to have occurred epidemically. The diseases of the digestive system are not of common occurrence, and are, for the most part, mild in character. The diarrhœas yield readily to a rational treatment. The dysenteries, being mostly unattended by general excitement, are promptly relieved by saline laxatives and opiates, hot fomentations and cold water enemata. Acute inflammatory rheumatism is a rare disease in this locality. In the subacute or chronic form, this disease is of more frequent occurrence, and is persistent in character; and although it may be relieved temporarily by a rational treatment, the disease is apt to return at every unfavorable change in the weather, and, as a general rule, the patient has finally to be sent to the Hot Springs of Arkansas for a permanent cure."

Dr. J. N. Bragg, of Camden, Arkansas, courteously responded to your committee, and furnished, under date of April, 1870, the following report of the diseases, etc., of his section of the State:—

"*Cholera.*—Camden, lying immediately on the Ouachita River, and being in direct communication with New Orleans, for six to nine months of each year, has, in seasons when cholera raged in the latter city and along the rivers leading thereto, had many cases of cholera, occurring on steamboats plying between the two points. Persons have died on boats at and near the wharf of Camden, and their remains were buried in the cemetery, yet the disease has never spread among the inhabitants. It is said by steamboat men that no one ever takes cholera on the river after he reaches the *pine* hills.

"*Yellow Fever.*—There has never been a case of yellow fever in this city. At those seasons when it is prevalent in localities south of us, there is no communication between those places and Camden; consequently there has never been a case brought here to test the matter of its spreading.

"*Smallpox.*—There has never been an epidemic of smallpox here. It happened to me to treat several cases of the disease in the spring of 1866. The disease was brought from Little Rock. The patients were at once isolated, and the disease did not spread. Occasionally a case of smallpox or varioloid is landed from a steamboat here, but the complaint has never been propagated from that or any other source.

"*Diphtheria.*—There has never been an epidemic of diphtheria in this section, and, indeed, I do not remember having seen a case of it in *twelve years.*

"*Influenza.*—An epidemic of influenza invaded this community in January of the present year. Since the 1st of March it has rapidly declined. Though intensely severe in many cases, it did not prove fatal in a single instance in the better classes. Among the negroes, particularly children, it has been attended with considerable fatality.

"*Dysentery.*—In the latter part of summer, and during autumn, dysentery is a common complaint—sporadic, however. But one epidemic of dysentery ever visited this section, and that was in the year 1857. It was of a most virulent type and exceedingly fatal. In many cases within forty-eight, and even thirty-six, hours after the inception of the disease, collapse came on, speedily followed by a fatal issue. The complaint appeared to carry off more whites than blacks. The weather was unprecedentedly cool in the month of August, when the epidemic was at its height, necessitating the sleeping under blankets at night. Many people here yet remember that time with a shudder, and when the atmosphere becomes unreasonably cold in the summer, numerous are the prognostications and fears expressed of 'Flux.'

"*Scarlet Fever.*—I know of no other febrile disorder worthy of mention, as visiting this section, than scarlatina. About the year 1849 and 1850, it appeared in Camden as an epidemic. In many cases it assumed the malignant form, and was attended with very great fatality. Ten years later it again made its appearance, but in the simple form, and I do not remember a fatal case of it.

"*Pneumonia.*—Pneumonia is not a very common affection with us, and those cases occurring are, for the most part, quite reasonable to treatment.

"*Remittent and Intermittent Fevers.*—Remittent fever is next to intermittent fever in point of frequency. Of the latter, we are accustomed to witness every known variety, but the tertian form is the most common. Congestive fever is occasionally met with in the early fall months. This form of fever is, however, not common, but, when occurring, is frequently of very difficult management I have observed that both remittent and intermittent fevers sometimes run into active congestion, but much more frequently does the latter than the former disease. I have noticed, moreover, that these instances occur, for the most part, with those who live on the *north side of swamps and marshes, and particularly when bodies of these lands are denuded of timber*, affording a fair sweep to the winds, which are almost uninterruptedly blowing from the south and southwest during the hot months, and taking up miasmatic matter and wafting it onward until, from dilution with pure air, or from other causes, it loses its noxious properties.

"In this connection—in relation to climatic fevers—it may be well enough to speak of a form of fever which I believe is known by several names, but here is more generally styled 'miasmatic fever.' Without entering into a detailed description of the disease, I shall merely mention its more prominent characteristics, as presented in this locality. In addition to the usual train of symptoms peculiar to those attacks of remittent fever wherein there is a great degree of prostration and sinking of the vital forces, there are, at first, frequent and copious discharges of a *dark fluid from the urinary organs*, resembling blood and oil mixed—partaking of the appearance and characteristics of both. After the lapse of a period—varying from one to several days in fatal cases—there is a total suppression of the discharge; the skin of the patient becomes frequently of a bronzed appearance; delirium, low and muttering, sets in, and death soon closes the scene. In the favorable cases there is a gradual change in the character of the urinary secretion toward a normal standard; the skin clears, and the patient enters upon a tedious and protracted convalescence. In this form of malarial fever I think it is safe to say that one-fourth of the attacks prove fatal. I speak of the disease as it has been seen by me during the last summer and the summer before. The observations of others may differ from my own. The various symptoms

are not identical in different cases. I kept no memoranda of the cases coming under my notice, but shall do so in future.

"The treatment, in different hands, has, of course, differed—diuretics, purgatives, and supporting with quinia. Mercurial preparations have been used cautiously. I am inclined to the *diuretic* plan of treatment, nitrate of potassa and turpentine in large doses. I was impressed with the advantage of this course. My friend Dr. Williams assures me that under its exhibition five out of six patients recovered.

"The origin of this fever is certainly the same as that of remittent and intermittent fevers; the poison, from some cause peculiar, producing this train of symptoms. Our type of bilious or remittent fever is, for the most part, mild; rarely ever continuing beyond the sixth day.

"*Phthisis Pulmonalis.*—This disease is of rare occurrence, and is invariably hereditary. It is rare that a case of the disease is seen in persons who have been reared here, though the parents may have died of this malady after moving here from the older States. Certainly phthisis is not of easy development in this region.

"*Scrofula.*—Scrofula is rare, and seldom manifests itself in its common forms. With us the 'scrofulous diathesis' is seldom seen.

"*Ozæna.*—I remember having seen only two cases in Camden. One of the cases is under observation at this time, and in this there exists the scrofulous diathesis.

"*Uterine Disorders.*—Diseases of this class are of rather *common occurrence.* In my own experience, ulcerations, or Meigs' raspberry inflammation, about the os and cervix, are oftenest seen. I have not had the misfortune to see those 'horrible' cases of engorgement, induration, ulceration, etc., that are so frequently charged upon the womb. Among the disorders of menstruation with us, dysmenorrhœa is most common.

"*Cutaneous Ills.*—We have none of any importance.

"*Typhoid Fever.*—This disease, as described in books, is, I believe, not known here. We see the 'low typhoid condition' occasionally as the result of certain forms of fever, but never fully characterized by the symptoms peculiar to true idiopathic typhoid fever. Sometimes patients, in the condition spoken of, have sordes, and low muttering delirium, without tympanitic condition or tenderness of the epigastrium. Again, we may find the latter symptoms prominent, and former absent; and so of the other characteristics of this disease.

"*Topography.*—There is nothing of peculiar interest in the topography of this region. The past winter has been remarkably mild. Sudden transitions in temperature sometimes occur. On the 1st day of January last the thermometer went down to 28° Fahr., but the cold only lasted *five days*. On the 13th day of March, at 6 o'clock P.M., the thermometer stood at 76°. At 8 o'clock P.M. it rained; at 9 o'clock P.M. there was sleet; at 12 o'clock, midnight, clear; mercury 32° Fahr. At day-break the next morning it stood at 25° Fahr. These were the only cold days of the season, the latter being the most remarkable vicissitude in temperature ever recorded here."

We are indebted to Dr. W. D. Summers, of Murfreesboro, for the medical topography of Polk, Pike, and a part of Sevier counties. He reports the southwestern part of the State generally healthy. Intermittent and remittent fevers are the most prevalent autumnal and vernal diseases. Congestive fever is rare. Pneumonia frequently occurs during the autumn and winter. Typhoid symptoms sometimes follow pneumonia and remittent fever; but pure typhoid fever is a type of disease rarely ever seen in that mountain region. Dysentery and diarrhœa prevail during the summer. In the lower part of the counties, among the cretaceous formations, enteric diseases are more common. Polk County is supplied with an abundance of delicious water. Streams and springs of pure water are found in the northern portion of Pike, and in part of Sevier County; but where chalk, marl, and shell deposits are found, the water is unhealthy, and unfit for use. Cisterns have been introduced throughout this region of the cretaceous belt, and cistern water mostly employed.

We will now further consider the medical climatology of the interior—that intermediate country about Hot Springs and the counties adjacent to it—between the regions heretofore described, viz., at the Capitol, the northwest, southeast, south, and southwestern parts of Arkansas. This division of the State is mostly an elevated country, composed of undulations, foot-hills, and mountains. Delightful springs, spring-streams, and rivulets abound throughout the area. The head waters of the beautiful Ouachita and Saline Rivers arise here. The rich alluvial bottoms, valleys, and vales, margining the tributaries of these streams, are sparsely inhabited. The settlers are chiefly engaged in husbandry. They are a hardy class; and diseases, save climatic fevers, pneumonia, dysentery, and diarrhœa, which appear at certain seasons,

are rare among them. Phthisis, scrofula, and goitre are scarcely known in these elevations, and rarely originate here. Hepatic, splenic, renal, enteric, and other functional ills of miasmatic origin, sometimes prevail, but these attacks are generally very manageable.

Malarial Fevers.—Tertian and quotidian intermittents are the most common forms of fever. Quartan is less prominent. Double quotidian and octan types are met with occasionally. Severe congestive attacks, known here as "congestive chills," sometimes occur, and death soon results when aloof from medical aid. Pernicious fevers, or any grave type of malarial fever, are met with. Epidemics and endemics are unknown in this mountainous part of the State. Within the past thirteen years no epidemics have prevailed at Hot Springs; and we have no history of the prevalence of any since its settlement. Cholera and yellow fever are here unknown. The atmosphere in this "pine section" appears to antagonize the invasion of these diseases. A form of ophthalmia prevailed in 1860–61 in some parts of Hot Spring and Montgomery counties. It was considered a malarial conjunctivitis. Scorbutic tendencies appeared among a few of the residents of Hot Springs and adjacent counties in 1860. It was known as "mountain scurvy," and was readily relieved by dietetic means. A case of variola occurred at Hot Springs in 1858. Precautionary means were assumed, and the spread of the disease obviated. Vaccination, when practicable, is a resort as a supposed prophylactic in variola.

Zymotic Diseases are scarcely familiar here to the profession. Varicella (a pseudo type, or a malady that sometimes strangely courses the same avenues), was endemic at Hot Springs in 1868. Scarlatina and diphtheria have never prevailed. Rubeola prevailed as an endemic in 1862, and again in 1868, attacking, indiscriminately, all ages, from childhood to adult life. It was not malignant, and few cases proved fatal. Cynanche parotidea was rife at Hot Springs in 1868. It was of a mild form, and no deaths resulted. Pertussis prevailed for three or four months at Hot Springs in 1867. Croup is rare; asthma uncommon. Erysipelas, of idiopathic type, is unknown. Dengue is not familiar to us. Typhus and typhoid fevers are unknown. Typho-malarial condition, and typho-pneumonitis sometimes supervene as a result of remittent fever and pneumonia. Rheumatism is not common. It is safe to state that gout never originates here. Uterine diseases

and puerperal complications are very rare. We are unacquainted with any country in the same latitudinal relations that has more advantages for health. All the attributes that we regard are here found to contribute to health and longevity. No part of the continent, within the same climatic realm, is more salubrious than this mountain section of Arkansas. The spring and autumn months are generally pleasant; the summer months are not exhausting by extremes of heat. The nights, throughout the hot months, are cool and invigorating. The winters are mostly mild and short in duration.

The advantages of the climate throughout the entire year, the pure, rarefied mountain air, the delightful waters—all give promise that the thermal springs in this part of the State will soon be one of the most celebrated resorts for invalids in the United States. Thousands now annually visit these springs; but if they were rendered more accessible, by the facilities offered for travel by railroad, ten times the number would seek this renowned watering place.

It is regretted that no satisfactory meteorological reports have been kept at Hot Springs, to give the daily mean temperature of the different seasons of the year. No medical society has yet been organized at Hot Springs. A record of the number of visitors arriving at the springs for each season, from April until November, has been kept from 1860 until the year 1871. The death-rate occurring annually among the visitors, has also been a matter of record, but such statistics are of no practical worth. An effort was made to procure the meteorological observations taken at Helena, Arkansas, but the observations did not extend to a period long enough for report. The careful observations of the late Dr. Smith, of Washington, Arkansas, published among the papers of the Smithsonian Institution, and the accompanying meteorological reports will be sufficient to give climatic surface to a large portion of the State.

It is proper to note that the observations at Fort Smith were copied from *Blodget's Climatology of the United States*. We are indebted for the report of the observations at Little Rock, for 1870, and the comparison in temperature drawn between that place and Dubuque, Iowa, to J. P. Henry's publication of the "Resources of the State of Arkansas." We are indebted to Dr. R. G. Jennings for the statement of the barometrical observations taken at Little Rock for 1871, by Geo. E. Dickson, Esq., at the office of the L. R.

and Fort Smith Railroad, and other meteorological reports for that year, furnished by L. G. Ripley, Hospital Steward, U. S. Army. We are grateful for all statistical information supplied by our respected friends to aid us in this report.

Without a disposition to burden this essay with personal narrative, it is, nevertheless, proper to state, that, from causes resulting from disaster and domestic affliction, your committee, since nominated for duty, has been denied the privilege of tendering a report at an earlier date. An expression of thanks is due to the Association for the courtesy extended by continuance of the committee under the disturbing circumstances of delay. All of which is respectfully submitted.

Meteorological Observations.

Amount of rain-fall at Little Rock, Ark., for the year 1871.

January . . .	4.1	August	1.1
February . . .	4.6	September . . .	.9
March	6.6	October . . .	2.1
April	9.9	November . . .	1.4
May	5.3	December . . .	.0
June	3.8		
July	4.0	Total	43.80

Thermometer Fahr. at Little Rock, Arkansas.

1871.	7 A M.	2 P.M.	9 P.M	Mean for month.	
January	36.45	48.60	44.13	43.06	
February	43.71	56.92	51.53	50.72	
March	48.96	64.09	57.48	56.88	Winter 50.22
April	58.43	70.00	65.53	64.65	
May	65.42	77.67	70.03	71.04	
June	79.86	84.60	79.33	81.26	Spring 72.32
July	80.00	84.90	81.53	82.14	
August	81.48	91.54	84.67	85.89	
September . . .	64.06	82.83	72.00	72.86	Summer 80.29
October	55.80	72.74	61.77	63.10	
November . . .	40.26	52.43	48.36	47.01	
December . . .	35.38	43.93	44.64	41.31	Autumn 50.44
Average for year .	...	...	...	63.32	...

Hygrometer at Little Rock, Arkansas.

1871.	7 A.M.	2 P.M.	9 P.M.	Mean for month.
January	34.70	44.45	40.16	39.77
February	41.42	51.71	47.42	46.84
March	46.19	56.45	51.87	51.50
April	54 63	63.03	57.63	58.43
May	61.45	69.22	64.58	65.08
June	74.93	78.30	74.70	75.97
July	75.35	78.93	75.96	76.74
August	74.54	85.25	76.61	78.80
September	62.46	74.03	67.56	68.01
October	53.49	67.96	58.66	60.03
November	36.80	52.33	47.20	42.27
December	30.12	45.16	44.25	39.84
Mean for year 1871 .	...	...	...	58.60

Barometrical observations at Little Rock, Arkansas.

1871.	Time. 6 A.M.	Time. 12 M.	Time. 6 P.M.	Mean. 6 A.M.	Mean. 12 M.	Mean. 6 P.M.	Total.	Mean for Month.
January	873.58	876.08	873.60	29.59	29.68	29.60	88.87	29.62
February	819.77	822.67	820.69	29.27¾	29.38	29.31	87.96¼	29.32¼
March	905.15	906.09	906.03	29.22¾	29.22¾	29.19¾	87.65	29.22
April	878.02	877.00	877.78	29.26	29.23	29.25½	87.76	29.25
May	902.41	902.44	902.44	29.11	29.11	29.11	87.33	29.11
June	874.29	874.35	874.36	29.14	29.14	29.14	87.43	29.14
July	905.67	903.68	903.66	29.21½	25.15	29.15	87.51½	29.17
August	902.54	902.59	901.64	29.11½	29.11½	29.08½	87.31½	29.10
September	882.66	886.67	882.75	29.42	29.55	29.42	88.40	29.47
October	917.70	918.76	918.55	29.60	29.63½	29.63	88.87	29.62
November	882 63	879.77	870.90	29.42	29.32	29.03	87.77	29.26
December	927.40	929.50	926.51	29.91	29.98	29.89	89.79	29.93

Table of mean temperature and precipitation in rain and snow, at Fort Smith, Ark.

Lat. 35.23. Long. 94.29. Altitude 460 ft., taken at the Military Post.

Thermometer from 1842 to 1854.		Barometer from 1837 to 1854.	
January	40°.2′	January	1.96
February	43.9	February	2.17
March	51.6	March	2.92
April	62.4	April	5.10
May	69.9	May	4.46
June	75.5	June	4.74
July	79.2	July	3.82
August	78.1	August	4.47
September	72.2	September	3.01
October	59.6	October	3.43
November	48.3	November	3.49
December	39.3	December	2.53
Spring	61.3	Spring	12.48
Summer	77.6	Summer	13.03
Autumn	60.1	Autumn	9.93
Winter	41.1	Winter	6.66
Year	60.0	Year	42.10

Thermometrical Observations taken at 7 A.M., 2 and 9 P.M. daily, at Little Rock, Arkansas, for the year 1870.

Months.	Maximum.	Date.	Minimum.	Average Temp.
January	72°	9 to 19	26°	45°
February	69	15 to 20	14	46 4′
March	73	9 to 24	26	49 1
April	84	16 to 22	33	61 3
May	93	7 to 23	52	71 8
June	94	8 to 22	60	76 5
July	94	8 to 16	68	81 8
August	90	13 to 30	69	81 4
September	96	6 to 28	59	76 6
October	87	20 to 30	42	63 7
November	86	4 to 26	31	54 8
December	73	7 to 24	4	38 5

Thermometrical Observations taken daily, at Dubuque, Iowa, for the year 1870.

Months.	Maximum.	Date.	Minimum.	Average Temp.
January	43°	16 to 17	6° below	21° 2′
February	51	20 to 26	7 do.	25 3
March	52	16 to 28	4 do.	30 8
April	82	13 to 24	28	52 9
May	87	3 to 22	48	67
June	102	7 to 29	56	74 5
July	100	25 to 30	58	77 9
August	95	5 to 20	51	70 8
September	88	7 to 19	51	65 9
October	72	1 to 31	26	50 7
November	60	6 to 22	22	39 7
December	51	1 to 23	12 below	24

Report of Temperature and Precipitation at Monticello, Drew County, Arkansas.[1]

	Maximum.	Minimum.	Mean.	Rain-fall.
March, 1869	73°	42°	54°	6.75 inches
April	78	52	59 21′	10.50 "
May	82	62	61 6	3. "
June	86	72	78	5. "
July	93	78	89	3.75 "
August	99	80	95	3.75 "
September				.85 "
October	72	46	66	2.13 "
November	70	46	56	5. "
December	54	33	44 31	8.63 "
January, 1870				4.50 "
February				1. "

[1] These observations were made at noon by Dr. W. H. Barry.

REPORT

ON

CLIMATOLOGY AND EPIDEMICS OF PENNSYLVANIA FOR 1871,

PARTICULARLY THE

EPIDEMIC HISTORY OF SMALLPOX IN PHILADELPHIA.

BY

W. L. WELLS, M.D.

REPORT ON CLIMATOLOGY AND EPIDEMICS OF PENNSYLVANIA FOR 1871, PARTICULARLY THE EPIDEMIC HISTORY OF SMALLPOX IN PHILADELPHIA.

BEFORE entering on my report, I must remark that its incompleteness is in consequence of my having failed to receive an answer to thirty out of thirty-six circulars which I sent more than three months ago to the Secretaries of the different County Medical Societies of this State. Of these six answers it will be seen that one is from the valley of the Susquehanna, three from the western part of the State among the upper valleys of the Ohio, one from the northern part of the State among the mountains, and one near Philadelphia.

It will be seen that scarlet fever, so prevalent throughout the State in 1870, diminished very much in 1871, but, on the other hand, that malarial fevers increased, and that smallpox made its appearance as an epidemic very generally throughout the State, beginning in Pittsburg.

From the meteorological record kept at the Pennsylvania Hospital in Philadelphia, it appears that the most remarkable circumstance connected with the temperature of the past year, was the extreme warmth of both March and April, a warmth unparalleled since the records began to be registered in this city.

The maximum temperature in the month of March occurred on the 17th when the mercury rose to 73° Fahr.; and the minimum on the 29th, when it fell to 34°.

The maximum temperature of April was on the 9th of that month, when it reached 85°; the minimum occurred on the 2d, when it fell to 38°.

The mean temperature of March was 48°.70 Fahr., or more than 7° above the average, and half a degree above March, 1859, the warmest previously known.

The mean temperature of April was 58°.15 Fahr., about 6½° above the average, and more than a degree and a half above April,

1844, the warmest previously known. Fortunately May also was warmer than usual, so that no injury was done to vegetation by frost.

The heat of the summer months, particularly that of August, was above the average, but it was far below that of the year before, and, consequently, we find only 11 deaths from sunstroke, instead of 52 as in the year before, and a diminution of 173 in the deaths from cholera infantum.

The temperature of the last two months of the year was decidedly below the average; that of December being even lower than the mean of January, and nearly 4° below the mean of December for the last forty-seven years. (See Table A.)

The statistics which follow have been furnished by the kindness of Geo. E. Chambers, Esq., Registration Clerk of the Board of Health. (See Tables B. and C.)

The total number of interments in Philadelphia, in 1871, was 16,993, a number exceeded only by the years 1864 and '65, when there were respectively 17,582 and 17,169 deaths, the great number then being caused chiefly by the deaths among soldiers, which amounted in the first year to 1598, and in the second to 778. The increase of 1871 over 1870 was 243 or 1.45 per cent. Deducting those who died elsewhere, and were counted because buried in Philadelphia (633 in number), we have 16,360 deaths, which makes (as the population of the city is 675,000) one death in 41.26 or 2.42 per cent.

Of the deaths recorded, there were 8942 males and 8051 females, showing an excess of 891 males, or 11.06 per cent. The deaths of persons over 20 were 8251. Under 20 they amounted to 8742, or deducting 875 stillborn, 7867.

The preponderance of deaths among males was observed both in adults and in children, although a little greater in children, on account of the very great excess of stillborn males.

Excluding the stillborn, the proportions of both sexes are about equal in the deaths of both adults and children.

The average for each quarter of the year is 4593; for each month 1431, for each day 46.

The fourth quarter, which shows the highest mortality, had 44 per cent. deaths more than the second quarter, which had the least mortality.

This is almost the reverse of the preceding year, when the fourth

quarter, instead of having the greatest, had the least mortality, and the highest mortality was in the third quarter.

The mortality at the Blockley Hospital, connected with the Almshouse, was 401. That of the colored population of the city, 957.

The epidemic diseases which in 1870 caused the greatest mortality either entirely disappeared, or very greatly diminished in the year just passed. Thus, the deaths by scarlet fever showed a diminution of nearly 700, falling from 956 to 262. Relapsing fever nearly disappeared, as only 7 died of it, instead of 162, which was the mortality of 1870. Of these, 3 were in January, being the last remaining of the epidemic of the preceding year. Yellow fever, which caused so much alarm in 1870, although the mortality was only 13, disappeared entirely in 1871, no cases originating in the city. These are only the most marked instances of what occurred, also, in all the other zymotic diseases, with one terrible exception. There were 100 fewer deaths from enteric fever, 52 less from croup, 27 less from diphtheria, 24 less from pertussis, 20 less from typhus, spotted fever, etc.; 5 less from rubeola, 3 less from cholera, and 1 less from malarial fever, puerperal fever, and erysipelas, respectively.

The year in which these different diseases caused the maximum mortality was 1861 for scarlet fever and diphtheria, when 1190 died of the former, more than five times the mortality of last year, and 489 died of the latter, more than three times the mortality of last year; 1864 for typhus and malarial fevers, when 818 died of the former, nearly ten times the mortality of last year, and 145 died of the latter, or nearly three times that of last year; 1865 for enteric fever, when 773 died of it, two and a half times the mortality of last year; and 1866 for rubeola and cholera, when 221 died of the former, or more than five times the deaths of 1871, and 910 of the latter, instead of 4 deaths from cholera in 1871.

The diminished mortality from these diseases alone, as compared with the preceding year, was 1104. There was also a diminution of 128 in the deaths from diseases of the digestive system, and a diminution of 215 in the deaths from diseases of the nervous system; 34 less from old age, and 205 less from debility in persons over one year.

On the other hand, there was an increase of 67 in deaths from diseases of the circulatory system, and an increase of 35 in those from diseases of the respiratory system; there were 152 more

deaths from congenital debility and malformation and 53 more still-born.

The chief cause, however, of the total increase of 243 in the mortality was smallpox, which has been raging so fearfully in the past few months, causing in all 1879 deaths in 1871. This terrible disease has been very fatal, not only in this country, but in the British Islands, and on the continent of Europe, during the past year. In England the mortality in 1870 from smallpox was 1259, in 1871 it rose to 13,174, and in London alone 7876. In all England, the proportion of deaths was 18 to 10,000 population, in London 24 to 10,000. (In Philadelphia 27 to 10,000). In London the epidemic began in the end of 1870, and gradually increased until the beginning of May after which it decreased, showing, however, a slight tendency to increase again in the last few weeks of the year. The mortality in the first quarter was 2400, in the second 3241, in the third 1255, and in the fourth 980. As it decreased in England it began on this side of the Atlantic, showing itself first in Pittsburg, and subsequently more or less in almost all portions of the State. In Philadelphia it did not begin until the end of July. There were but 8 deaths from it in the first six months of the year, and in June, the last of these months, there were no deaths. In July there were 5 deaths, in August 16, in September 18, in October 331, in November 640, and in December 861, thus showing that, even after the disease had fairly obtained a foothold, more than two months passed by before the mortality became suddenly alarming.

The manner in which the disease skipped about the city at first was remarkable. It began in the neighborhood of Sixteenth and Sansom in August, passing in the same month to Seventeenth and Pine. Of the 16 deaths in that month, 7 were in the Eighth Ward where both these localities are situated. It is singular that in the following month, September, only 2 cases were reported in this ward, but a number, more than a mile away, near Tenth and Master, and Eighth and Columbia Avenue, in the Twentieth Ward, where not only no death but no case of the disease had occurred in the month preceding. In October it increased to an alarming extent in that ward, causing 89 deaths there; attacked the western part of Race Street, where also it was pretty severe, and established itself in all parts of the city, save only in Manayunk and its neighborhood. In November its severity diminished one-fourth in the Twentieth Ward, but doubled or nearly so everywhere else, and

then for the first time it became really severe in the southern part of the city, where the most crowded streets and degraded and filthy population are found. In this month, 6 cases were reported as originating in the Twenty-first Ward.

In December, the disease was still more severe and still more uniformly diffused; diminishing considerably in violence only in the Twentieth Ward, which it had attacked so overwhelmingly in October, and where it had already begun to diminish in November.

It is worthy of notice that the neighborhood less attacked than any other, and last attacked, was the northwestern part of the city, Manayunk, and its neighborhood, from which the prevailing winds blow in the cold weather,[1] while the district earliest attacked and most severely, was that part of the closely built up portions of the city nearest to this very healthy district.

In November and December, the Third and Fourth Wards were most severely attached, while Germantown and West Philadelphia were, next to Manayunk, the most nearly exempt portions of the city.[2]

The deaths among the colored population were about in the same proportion as those among the whites.

As regards the age of those attacked, the young were especially liable to it. 836, or nearly half the whole number of deaths, were of persons under 10 years of age; 607, or nearly one-third, of persons under 5; 316, or about one-sixth, under 2 years; and 203, or nearly one-ninth of the whole number, were of infants under 1 year.

Between the ages of 10 and 20 only 323 died, being nearly 100 less than half the mortality in the preceding ten years. Between 20 and 30 there was an increase to 397, or nearly half the mortality in those under 10, and a little more than one-fifth of the total mortality. After 30, the risk of death rapidly decreased, the number of deaths in each succeeding period of ten years being, on the average, a little less than half that in the one before it, until we come to the period between 60 and 70, when there were 24 deaths, followed by only 7 in the next ten years, and 2 between 80 and 90, after which there were no deaths. This rapid diminution is of course far greater than can be accounted for by the smaller number of persons at a more advanced age. See Table E.

[1] This immunity continued up to May, 1872.

[2] The severity of the epidemic has steadily but slowly diminished, until in the week ending May 4 there were only 35 deaths.

A remarkable feature of this epidemic was the number of persons attacked who had had smallpox already, some even two or three times.

As regards the protection afforded by vaccination and revaccination, the statistics of the Board of Health are incomplete, but I have received the following particulars from W. M. Welch, M. D., physician in charge of the Municipal Hospital. In that institution there were treated in all in 1871, 1189 cases, of which 382, or nearly one-third, proved fatal,[1] 32 per cent. Of these, 390 had never been vaccinated, of whom 254 died, or 65.1 per cent.; 331 had been vaccinated in infancy, and had a good mark, of whom 33 died, or 9.9 per cent.; 166 vaccinated in infancy—fair mark, of whom 27 died, or 16.2 per cent.; 302 vaccinated in infancy—poor mark, of whom 68 died, or 22.5 per cent. As regards revaccinated cases, Dr. Welch furnishes no statistics, but says only that "smallpox after successful revaccination is in his experience exceedingly rare." As a large number of cases of variolous disease after revaccination have undoubtedly occurred in the city, this experience of Dr. Welch confirms the experience of others that such cases are generally very light, so much so as hardly ever to be taken to the hospital.

The only epidemic of smallpox which has equalled the present in severity since 1807 (when the records of the Board of Health begin), was in 1824, when there were 330 deaths, which in proportion to the population of 135,000 or 140,000 at that time, gives about the same relative mortality as in the past year. No other epidemic has, in any one year, caused more than half the relative mortality of these two years. See Table F.

The present epidemic was preceded by a period of remarkable exemption from the disease, during which, we may suppose, persons would become careless and neglectful of vaccination until smallpox, ever watchful of any such opportunity, would cruelly punish them for their thoughtlessness. A like period of exemption is to be found before the epidemic of 1824 (which began in the preceding year), as from 1820 to 1822, both inclusive, there was no death from the disease, and there was another period of exemption before the epidemic of 1861.

[1] Some of these deaths occurred in 1872, the cases having been admitted to the hospital in 1871.

TABLE A.—*Comparison, in Philadelphia, of the Temperature of 1872 with that of other years.*

	Mean temp. of 1872.	Max.	Min.	Average means for 47 years.	Warmest.	Coldest.	Rain in 1872, in inches.
January,	31°.29	64°.	7°.	31°.89	1858, 39°.75	1857, 22°.25	3.466
February,	33.93	60.	7.5	33.16	1834, 42.	1838, 23.	3.086
March,	48.70	73.	34.	41.3	1871, 48.70	1843, 30.25	5.814
April,	58.15	85.5	38.	52.01	1871, 58.15	1857, 45.25	1.829
May,	66.26	91.5	48.	62.72	1826, 72.	1850, 57.75	3.383
June,	74.51	90 5	60.	71.76	1871, 77.21	1833, 65.	3.773
July,	76.68	97.	60.	76.38	1871, 80.61	1836, 72.	6.811
August,	78.50	92.5	64.	73.83	1863 & 4, 79.5	1836, 66.	5.971
September,	63.80	82.5	43.	66.37	1865, 72.5	1829, 60.	1.772
October,	57.87	77.	38.	55.29	1835 & 61, 60.	1836, 47.	4.863
November,	41.	66.	22.	44.67	1849, 51.5	1842, 38.5	4.293
December,	30.85	45.	2.5	34.7	1848, 43.25	1831, 25.	2.259
Years,	55.13	...	...	53.67	.....	.....	47.320

TABLE B.

	Total.	Males.	Females.	Adults.	Minors.	Boys.	Girls.	Stillborn.			Under 1 year.	1 to 2 years.	2 to 5 years.	5 to 10 years.	10 to 15 years.	15 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	60 to 70 years.	70 to 80 years.	80 to 90 years.	90 to 100 years.	100 to 110 y'rs.	120 to 130 y'rs
								Males.	Females.	Total.																
January,	1154	586	568	590	564	298	266	40	30	70	297	74	104	44	13	32	109	102	104	87	75	64	38	9	2	
February,	1167	628	539	619	548	298	250	33	27	60	290	83	106	31	14	24	127	126	94	80	69	75	40	8		
March,	1430	753	677	769	661	364	297	53	32	85	373	77	108	49	22	32	150	147	118	100	109	94	41	10		
April,	1104	572	532	621	483	266	217	28	21	49	250	64	83	33	25	28	143	118	96	73	86	60	36	8	1	
May,	1297	678	619	741	556	302	254	44	31	75	313	75	81	30	31	26	148	134	124	90	103	81	51	8	2	
June,	1225	666	559	547	678	377	301	40	29	69	445	86	66	35	20	26	110	115	80	71	92	59	16	4		
July,	1656	881	775	579	1077	572	505	48	37	85	730	180	81	37	20	29	120	127	71	71	82	70	34	4		
August,	1553	775	778	650	903	474	429	39	33	72	543	186	79	30	24	41	140	139	109	69	70	80	40	3		
Septemb'r	1080	581	499	549	531	270	261	41	28	69	307	89	52	19	24	40	108	109	80	82	66	66	29	7	1	1
October,	1545	828	717	783	762	411	351	49	32	81	343	104	115	83	55	62	194	151	118	110	97	78	29	6		
November	1694	860	834	806	888	431	457	47	32	79	331	102	161	124	64	106	249	146	131	104	70	60	40	5	1	
December,	2088	1134	954	997	1091	562	529	40	41	81	393	125	241	136	63	133	319	209	132	114	86	84	39	13	1	
Total,	16993	8942	8051	8251	8742	4625	4117	502	373	875	4615	1245	1277	651	375	579	1917	1623	1257	1051	1005	871	433	85	8	1

TABLE C.—*Classified Table of Deaths in Philadelphia in* 1869, 1870, *and* 1871.

	1869.	1870.	1871.
ZYMOTIC DISEASES:—			
Typhoid fever	388	412	313
Typhus (spotted, &c.)	88	109	89
Malarial fever	50	59	58
Yellow "		13	
Puerperal "	18	29	28
Relapsing "		162	7
Variola	6	9	1879
Varicella	2		
Rubeola	85	48	43
Scarlatina	799	956	262
Pertussis	74	105	81
Diphtheria	175	172	145
Croup	237	316	264
Erysipelas	50	58	57
Cholera	9	7	4
Total	1981	2455	3230
RESULTS OF POISONING:—			
Hydrophobia	7	1	1
Alcoholic intoxication	42	38	48
Mania-a-potu	48	56	27
Syphilis (over 16)	8	13	7
Total	105	108	83
ALTERATION OF THE BLOOD:—			
Anæmia and chlorosis	22	22	15
Leucocythæmia		3	3
Pyæmia	39	43	35
Scurvy	1	1	
Total	62	69	53
CONSTITUTIONAL DISEASES:—			
Rheumatism	24	14	26
Gout	3	3	3
Tuberculosis of brain (including dropsy of brain)	174	133	153
Tuberculosis of lungs (including hemorrhage of lungs)	2040	2374	2286
Tubercles of mesentery	631	698	583
Cancer	232	261	282
Scrofula	85	80	64
Syphilis (under 16)	13	10	12
Total	3202	3573	3409

TABLE C.—*Continued.*

	1869.	1870.	1871.
DISEASES OF THE NERVOUS SYSTEM:—			
Inflammation of brain	367	418	401
Apoplexy	181	240	248
Congestion of brain	316	378	312
Effusion on brain	50	56	50
Softening of brain	57	79	89
Other, or non-specified disease of brain	72	112	89
Inflammation and congestion of spine	4	11	5
Other, or non-specified disease of spine	22	23	18
Softening of spinal cord	2		1
Paralysis	206	226	217
Tetanus	28	44	37
Epilepsy	25	34	37
Insanity	5	7	2
Convulsions	647	733	639
Puerperal convulsions	25	23	28
Hysteria	1		
Chorea		5	1
Total	2008	2389	2174
DISEASES OF THE CIRCULATORY SYSTEM:—			
Inflammation of heart	34	36	28
Fatty degeneration of heart	11	13	12
Dropsy of heart	35	33	31
Neuralgia of heart	24	15	19
Other, or non-specified diseases of heart	474	504	590
Syncope	4	4	2
Aneurism	5	13	8
Inflammation of veins			5
Total	587	618	685
DISEASES OF THE RESPIRATORY SYSTEM:—			
Disease of glottis	1	2	4
Laryngitis	30	32	26
Ulceration of larynx	2		1
Obstruction of trachea	1		
Bronchitis	165	161	145
Catarrhal fever	22	19	14
Congestion of lungs	151	154	182
Pneumonia	808	812	848
Dropsy of chest	58	56	51
Asthma	31	24	30
Pleurisy	16	17	14
Emphysema	10	10	7
Empyema	1	2	2
Total	1296	1289	1324

TABLE C.—*Continued.*

	1869.	1870.	1871.
DISEASES OF THE DIGESTIVE SYSTEM:—			
Tonsillitis and disease of throat	14	28	19
Sore mouth	11	10	13
Stricture of œsophagus	3	5	3
Dyspepsia	1	2	2
Inflammation of stomach and bowels	223	281	278
Ulceration of stomach and bowels	19	20	23
Hemorrhage from stomach and bowels	13	11	17
Congestion of bowels	2	3	6
Diarrhœa	175	191	174
Dysentery	93	82	98
Cholera infantum	885	1002	829
Cholera morbus	52	38	33
Obstruction of bowels	38	33	34
Other or unspecified diseases of stomach and bowels	12	22	30
Peritonitis	100	95	115
Hernia	18	15	17
Worms	2	1	
Hepatitis and congestion of liver	58	42	69
Other or unspecified diseases of liver	59	89	100
Jaundice	27	33	32
Disease of spleen		2	3
Dropsy (abdominal and varieties not specified)	259	272	259
Total	2074	2277	2154
DISEASES OF THE GENITO-URINARY APPARATUS:—			
Nephritis	23	24	23
Diabetes	21	18	17
Degenerations of kidneys (albuminuria, &c.)	35	54	39
Other or unspecified diseases of kidneys	66	60	98
Suppression of urine	2	1	2
Uræmia	17	21	23
Diseases of bladder	19	35	26
Disease of prostate gland	3	1	2
Stricture or rupture of urethra	1	1	1
Gravel and stone in bladder	1	3	
Disease of uterus	18	35	20
Disease of ovary	8	5	8
Died in childbed	20	12	9
Total	234	270	268
CONGENITAL DEBILITY AND MALFORMATION:—			
Malformation	15	21	17
Debility (under 1 year)	374	433	581
Inanition (under 1 year)	217	214	212
Cyanosis and asphyxia	124	97	107
Total	730	765	917

TABLE C.—*Concluded.*

	1869.	1870.	1871.
DISEASES OF SKIN:—			
Eczema	2	1	3
Hives		2	
Disease of skin (kind not stated)		2	
Total	2	5	3
DISEASES OF BONES:—			
Inflammation of bones	1		2
Necrosis	5	5	6
Disease of hip	9	7	6
Caries	16	8	7
Total	31	20	21
VIOLENT DEATHS:—			
Burns and scalds	68	58	90
Drowned	103	149	113
Casualties	187	191	203
Exposure	7	4	6
Fractures	31	14	14
Gunshot wounds	7	13	13
Wounds (nature not specified)	5	3	2
Heat fever (sunstroke)	12	52	11
Hanging	1		1
Murder	18	17	20
Poisoning	16	6	15
Rupture of spleen	1		
Shock	4	2	5
Struck by lightning		2	
Strangulation	6	6	6
Suicide	45	25	41
Suffocation	20	14	17
Total	531	556	557
Stillborn	790	822	875

These tables fail to account for 1240 deaths in 1871, 116 of which were reported as unknown to the Board of Health, and some were from the following more or less uncertain causes.

	1869.	1870.	1871.
Congestion (of what not stated)	7	6	6
Gangrene " "	36	38	38
Hemorrhage " "	54	59	51
Ulcers, abscesses, and boils (where not stated)	87	79	66
Compression of brain and spine	23	19	11
Cramps	23	21	15
Old age	480	588	554
Teething	32	44	42
Tumors	21	38	35
Debility (over 1 year)	262	376	171
Inanition (over 1 year)	65	76	53

TABLE D.—*Monthly return of the Smallpox cases in each Ward in Philadelphia.*

Ward.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total cases.	Total deaths.	Per c't of population.
1st Ward,	...	...	1	22	88	132	246	48	0.147
2d "	...	...	2	38	118	163	323	74	0.245
3d "	...	...	2	41	118	151	313	104	0.54
4th "	1	1	4	64	203	189	470	117	0.56
5th "	...	2	1	49	69	124	248	51	0.27
6th "	...	...	2	28	59	64	161	18	0.15
7th "	2	4	5	74	132	149	370	61	0.19
8th "	1	21	2	21	43	54	144	27	0.12
9th "	...	6	5	39	43	53	148	20	0.12
10th "	1	6	8	114	176	109	414	61	0.26
11th "	...	...	3	27	93	161	287	59	0.39
12th "	...	2	3	30	86	95	216	43	0.28
13th "	...	1	3	53	119	87	263	44	0.22
14th "	1	1	10	58	115	110	295	51	0.23
15th "	1	2	9	27	131	217	387	61	0.14
16th "	...	1	11	45	115	136	308	104	0.53
17th "	...	...	1	32	118	154	306	66	0.31
18th "	1	...	1	82	160	166	410	89	0.33
19th "	...	1	5	52	197	277	537	125	0.28
20th "	...	...	23	582	430	296	1336	207	0.365
21st "	1	...	...	...	6	9	16	2	0.014
22d "	...	...	...	2	14	31	48	5	0.022
23d "	1	...	...	15	59	42	117	31	0.15
24th "	1	3	3	40	32	49	131	23	0.05
25th "	1	...	...	11	59	76	148	30	0.16
26th "	2	7	5	37	88	127	268	42	0.11
27th "	1	...	...	10	14	28	55	12	0.06
28th "	...	...	2	35	54	58	149	298	
Total cases,	15	58	111	1628	2944	3307	8114	1879	0.278
Total deaths,	5	16	18	331	640	861	1879		

Appendix to TABLE D.

Weekly record of smallpox for 1872.

Date.	Cases.	Deaths.
January, week ending 6th	771	230
" " " 13th	828	216
" " " 20th	642	209
" " " 27th	553	177
February, " " 3d	557	158
" " " 10th	434	183
" " " 17th	399	136
" " " 24th	445	138
March, " " 2d	359	121
" " " 9th	347	118
" " " 16th	296	120
" " " 23d	265	94
" " " 30th	245	83
Total for three months of 1872	6144	1983
Total for year 1871	8114	1879
Total from the commencement of epidemic	14258	3862

Appendix to TABLE D.

Report of cases of smallpox and mortality, arranged by wards, for the first three months of 1872.

Ward.	Cases.	Deaths.	Ward.	Cases.	Deaths.
1st	370	95	17th	240	102
2d	327	107	18th	239	85
3d	183	57	19th	778	236
4th	313	93	20th	219	62
5th	276	71	21st	40	5
6th	142	17	22d	80	21
7th	293	75	23d	79	18
8th	103	24	24th	209	51
9th	92	21	25th	231	77
10th	101	23	26th	340	109
11th	211	60	27th	64	20
12th	136	34	28th	117	273[1]
13th	126	29	29th	189	45
14th	166	28			
15th	270	64	Total	6144	1983[2]
16th	210	77			

[1] Including 241 deaths in the Municipal Hospital.

[2] Including 4 deaths from the country.

TABLE E.—*Deaths from Smallpox, in Philadelphia, at various periods of Life.*

	Total deaths.	Males.	Females.	Adults.	Minors.	Boys.	Girls.	Colored.	Under 1 year.	1 to 2 years.	2 to 5 years.	5 to 10 years.	10 to 15 years.	15 to 20 years.	20 to 30 years.	30 to 40 years.	40 to 50 years.	50 to 60 years.	60 to 70 years.	70 to 80 years.	80 to 90 years.	In the Almshouse.	In the 28th Ward which contains the Municipal Hospital.
Before July,[1]	8	4	4	2	6	3	3	1	3	...	3	...	...	...	1	1	...	...	...	...	...	...	2
July . . .	5	5	...	3	2	2	...	1	...	...	2	...	...	...	2	1							
August . .	16	9	7	7	9	5	4	...	3	4	1	...	...	1	5	2	...	...	...	...	...	...	1
September.	18	10	8	7	11	6	5	...	3	...	1	3	...	4	5	2	...	...	...	...	...	...	4
October. .	331	169	162	123	208	101	107	17	29	25	44	45	37	28	61	22	18	14	6	1	1	1	55
November .	640	343	297	255	385	188	197	54	65	32	94	86	37	71	135	55	41	10	9	4	1	1	111
December .	861	476	385	323	538	273	265	69	100	51	147	95	45	100	188	79	29	16	9	2	...	...	126
Total . .	1879	1016	863	720	1159	578	581	142	203	112	292	229	119	204	397	162	88	40	24	7	2	2	299

[1] None in June.

TABLE F.—*Deaths from Smallpox in Philadelphia since* 1807.

1807	32	1832	43	1852	438
1808	145	1833	168	1853	57
1809	101	1834	212	1855	41
1810	34	1835	106	1855	305
1811	117	1836	86	1856	415
1812	none[1]	1837	81	1857	72
1816	97	1838	45	1858	7
1817	52	1839	5	1859	2
1818	8	1840	63	1860	57
1819	1	1841	265	1861	758
1820	none	1842	161	1862	264
1823	160	1843	37	1863	171
1824	330	1844	18	1864	260
1825	6	1845	200	1865	524
1826	3	1846	257	1866	144
1827	100	1847	11	1867	48
1828	114	1848	102	1868	1
1829	84	1849	163	1869	6
1830	87	1850	40	1870	9
1831	4	1851	224	1871	1879

The following report has been received from Dr. W. H. Daly, Pittsburg, Allegheny County, Pa.

Malarial disease has prevailed here to a greater extent these past ten months than for years before; of an intermittent or remittent type in the beginning, which, if not checked, invariably assumed a typhoid form (not pure typhoid fever), with alternate abatement and exacerbations until death or recovery. The mortality has been greater than in former years.

Enlargement of the parotid gland or glands has been observed in many of the severer cases, and many or most of these prove fatal.

Smallpox prevailed extensively from June to October, especially in August and September. You will recollect that Pittsburg was in advance of all other American cities in the late epidemic of smallpox, and it would appear that this was the point from which it radiated.

The following statistics are from Butler County, just north of Allegheny County.

This county has a rolling surface, streams with one or two exceptions not stagnant, but clear and rapid (no swamps). The last summer was very dry, less rain fell than has been known for

[1] Returns incomplete.

many years. The last winter has been extremely cold and long continued, the ice on the creeks not going off for four months, with very little snow. During the past summer, in my practice, diseases have assumed more of an intermittent form than usual, but still not very decidedly so (ague and bilious remittent fevers do but very rarely occur here, save as importation). We have had here but a small amount of scarlatina during the present winters, none fatal. Some diphtheria of the genuine form. But little typhoid fever during the past year. Our chief diseases have been catarrhal fevers and pneumonia among children, and pneumonia and lung affections among adults. In my portion of the county (the northwest) we have not had any smallpox. In some other sections of the county there has been some, and generally bad. I have noticed that the great majority of cases of revaccination took well, and run the ordinary course of vaccinia; also, that several that had been previously impervious to vaccination took readily this winter and spring. I inclose you the statement of Dr. Neyman, of our county, the only one I have been able to get any information from.

Respectfully yours,

G. W. COULTER,
Sec. Butler Co. Med. Soc.

BUTLER, March 28, 1872.

DEAR DOCTOR: Your letter for information concerning Climatology, etc., came to hand.

Pneumonia here almost amounts to an epidemic, and, what I think peculiar, every case is attended with lateritious sediment.

We had in mid-winter a run of rheumatism.

As regards Climatology, for length of winter and extreme low temperature long continued, I do not remember anything like it.

We had a large number of cases of scarlatina anginosa in the early winter, an occasional case since; and a few cases of genuine diphtheria.

I have noticed for several years (two or three) a growing tendency to intermittent type of diseases in this hitherto very anti-intermittent climate. And especially during the past year I have had more intermittent character of cases, and have even treated some actual intermittent fever, indigenous, contracted here. There has been a decided change here in this respect during 1871. We have had some smallpox cases in the vicinity, imported from Pittsburg, and generally fatal.

Yours truly,

A. M. NEYMAN.

The following is the report from Westmoreland County, east of Pittsburg:—

LATROBE, PA., February 14th, 1872.

GENTLEMEN: We have the honor to report the following, in regard to the late epidemic of smallpox of this place.

We include in our report all cases officially reported by the town authorities, all cases which were in the immediate suburbs of the borough; all cases which occurred prior to the calls from the borough officers for reports from the physicians, also a few cases of variolous fever.

Total number of cases	51
Number of cases unvaccinated	21
" " vaccinated	30
Variola	21
Modified variola	25
Variolous fever	5
Deaths	11
Under five years	6
Between ten and fifteen	2
" twenty-five and thirty	1
" forty and fifty	2
Vaccinated	1
Unvaccinated	10

The vaccinated patient was between forty and fifty, and had never been revaccinated.

There were three additional cases in the county, each case in a different family, and all the cases attended by different physicians of this borough.

Between the ages twenty and thirty	3
Vaccinated (in infancy)	1
Unvaccinated	2
Deaths	3

The date of the attack of the first patient was October 20, 1871; and the date of the discharge of the last patient was January 20, 1872. Duration of the epidemic three months. Strict sanitary measures and vaccination were the means used to prevent the spread of the disease.

It is with pleasure that we add our testimony in favor of vaccination, believing that it not only has a powerful modifying

influence on the disease, but in many instances is an absolute protection. We would also recommend that the operation be performed early and thoroughly, and from our observations we are fully convinced that the virus should be inserted at not less than two points, and be repeated until no effect can be produced.

Very respectfully submitted,

W. C. COLEMAN, M.D.
D. W. McCONAUGHY, M.D.

The following report has been received from Dr. E. P. Allen, of Bradford County, on the northern border of the State:—

ATHENS, BRADFORD COUNTY, April 5, 1872.

Dr. W. L. WELLS, *Philadelphia.*

DEAR SIR: You will find in the *Transactions* of the Pennsylvania State Medical Society of 1859, in the report from Bradford County Medical Society, a geological report that will give you a good idea of what our climate naturally would be. We are north of all the high ranges of the Allegheny Mountains, our county is mostly uneven, but our hills are not very high. We have good water and pure air. The consequence is that we do not have very many diseases of a zymotic character.

In the south part of the county, in the valley of the Susquehanna River, and extending as far north as Towanda, since the North Branch Canal has been built, intermitting and remitting fevers have been quite prevalent, but they are readily cured by the great antiperiodic remedy, quinine.

Typhoid fever occasionally appears as an epidemic in most of the townships of the county, but, from some cause unknown to the writer, it appears more often in the Townships of Springfield, Troy, Columbia, and Canton than elsewhere. I think that intermitting fevers prevailed less last year than in former years.

Smallpox appeared in Barclay Township among the coal miners last December, and was carried to Towanda from that place; prompt measures were taken to arrest the disease by separating the sick from the unprotected; and the public authorities were vigorous in causing vaccinations, and the consequence was that the disease was soon arrested. Not more than eight cases were reported in Towanda, of variola and varioloid, and I think not more than ten or twelve in Barclay. Since writing the foregoing, I have learned that forty cases appeared at Barclay, and ten died.

The arrest of the disease is undoubtedly owing to vaccination, which has been pretty thoroughly practiced through the county. If it were necessary to furnish proof of the protecting powers of vaccination, the writer could give several striking examples, one of which may here be given. Fifteen years ago, I was called to see a young man in the employment of two farmers whose houses joined, and found he had variola. In the two families there were fourteen unprotected persons who had been daily with the sick man. They were all immediately vaccinated by me, and twelve of the fourteen were successful in the vaccination, and did not take variola. The two in whom vaccination did not take had smallpox. This is but one of numerous cases that have been under observation. Eight years ago, the writer treated thirty-five cases of smallpox in the township of Litchfield and borough of Athens. It will be observed that smallpox is not a new thing in our county, and that it has prevailed before much more extensively than the present year. This is undoubtedly owing in part, and perhaps entirely, to prompt attention to vaccination.

At present an epidemic is prevailing, in many townships of the county, of cerebro-spinal meningitis. The cases in each place are few. I have not known more than five in one town.

The following statistics are from Perry County, west of Harrisburg. Contributed by Dr. M. B. Strickler, New Bloomfield.

Our county has low river districts as well as mountainous districts. Under the following heads are condensed the various data received.

General Head.	*Upland Districts.*	*River Districts.*
Fevers.	Bilious and quotidial intermittent; fall and winter.	Malarial fevers prevailed to a greater extent than for ten years past; attributed to extreme heat early in May, and low water.
Lungs.	Some pneumonia and phthisis pulmonalis; same as in preceding years.	Lung diseases about as usual.
Nutrition.	Some hepatic and gastric disorders in summer and fall.	
Circulatory system.	None in particular.	Anæmia, caused by miasma.
Nervous system.	Some hysteria and some paralysis.	Neuralgia prevails in all its forms.
Of the osseous system.	Some cases of periostitis.	None.

General Head.	*Upland Districts.*	*River Districts.*
Miscellaneous.	Some cases of scarlet fever, assuming malignant type in some cases.	
General remarks.	Upland districts generally healthy; about same as preceding years.	Of smallpox we have had several cases, particularly at Newport; two at Duncannon, some at New Buffalo, and a case or two at Millerstown; generally took a malignant type; generally fatal in the absence of previous vaccination; no case proved fatal where vaccination had been resorted to in proper time.

To several members of the Perry County Medical Society in different localities, I am indebted for data.

Observations taken April 1, 1871, *to March* 31, 1872, *inclusive.*

Months.	Average temperature. Observations taken 8 o'clock A.M.	Mean maximum temperature.	Mean minimum temperature.	Fall of snow during month in inches.	Fall of rain during month in inches and tenths of inches.	Remarks.
April,	46° 14′	61° 20′	41° 14′	2 in.	...	
May,	55 0	73 29	48 52	0	5.0	Low barometer.
June,	65 16	82 0	58 52	0	5.2	Medium "
July,	67 32	80 47	62 11	0	8.0	" "
August,	67 12	84 21	66 25	0	7.3	High "
September,	53 30	69 6	47 38	0	2 1	" "
October,	47 40	65 16	42 9	0	4 0	Medium "
November,	36 26	49 4	31 10	5	4.1	High "
December,	26 15	40 10	19 40	7	0.8	" "
January, 1872,	22 27	38 39	18 45	9	0.5	Medium "
February, "	22 25	39 35	14 18	14	1.0	High "
March, "	27 37	42 25	20 50	7	1.4	Low "

The above table was furnished by B. McIntire, Esq., from his Weather Register Observations taken at Bloomfield, the county-seat of Perry County.

The following report has been received from Dr. Joseph Foulke, Bucks County, on the eastern border of the State, dated February 9, 1872.

"Buckingham valley, where I reside, is rather a healthy locality. We have but very little malarial fevers; an occasional case of

typhoid fever, and once in a while an intermittent or a bilious remittent, are about all. I do not think we have had any of the relapsing fever; I have not seen a case. We have had a slight sprinkling of smallpox; but the extensive vaccinations and re-vaccinations here, as well as elsewhere, seem to have checked its spread. There seems to be a much greater predisposition to exanthematous affections this season than usual."

REPORT

ON THE

CLIMATOLOGY AND EPIDEMICS OF MINNESOTA.

BY

CHARLES N. HEWITT, M.D.,

RED WING, MINNESOTA.

REPORT ON THE CLIMATOLOGY AND EPIDEMICS OF MINNESOTA.

In collecting data for this, my second annual report, the same plan as was followed last year has been adopted.

The increased interest felt on these subjects by the profession throughout the State, since they have been made the occasion of special reports to the National and State Associations, has resulted in a greater variety of data than before.

For many reasons, no statistics as to climate are ready for presentation. Some from St. Paul are in my possession, by the courtesy of Dr. D. W. Hand, of that city, but are delayed till others are obtained, which, tabulated with them, will secure a more complete record.

In a new country like ours, instruments and methods of precision are but little used, except when necessary for immediate practical results. This is as true of medicine as of any other art, but I think I may claim for my brethren here, that they are rapidly working their way to the use of every means which can facilitate their work or advance their knowledge, and that but a short time will elapse before thorough climatic and other observations will be the rule.

The report on diseases presents two unusual features—an extensive operation of paludal poison; and the occurrence of an epidemic of cerebro-spinal meningitis in some of our towns, and its threatened spread to other parts of the State.

Dr. B. R. Palmer, of Sauk Centre, has at my request written briefly his experience for this season of this dreaded disease, and Dr. W. W. Sweney, of Red Wing, gives, from ample experience, an account of the epidemic of 1864 in Red Wing.

I append these papers to this report, not as necessary to the history of disease, which it is my duty to secure, but as fair

examples of the observation and study brought to bear on diseases among us. I beg leave to refer to my last report for many details as to diseases prevailing before the epidemic described by Dr. Sweney, unnecessary for that reason to be written here.

I am happy to be able to report the organization of a State Board of Health, by the Legislature of Minnesota, in accordance with the request of this Association, expressed at its last meeting. The Board have already begun their work, encouraged by the cordial co-operation of the entire profession of the State.

ENTERIC FEVER.—Less frequent and less severe than last year.

Epidemic: "At St. Paul, during September, October, November, and December, 1871, and January, 1872, confined to no locality, and has been as common on the bluffs back of the city as in the more crowded neighborhoods near the river. In some houses there, four or five cases have occurred, but in no instance have I been able to settle definitely upon any particular local cause." (Dr. W. Hand.)

At Stillwater, on the St. Croix, 23 cases are reported in the practice of one physician (Dr. Reiner), 3 deaths; one from perforation of the bowels; two from intestinal hemorrhage. In other places, where the disease has hitherto been almost endemic, no cases are reported.

ENTERO-MALARIAL (typho-malarial).—Though not so general throughout the State, this variety of fever has been more than usually common along the Mississippi River. At St. Cloud, on the upper river, Dr. Senkler reports 36 cases: 18 in February, March, and April; 12 in August, September, and November. "Paludal influence well marked. 15 cases occurred on the shores of a small muddy lake. The sporadic cases were the severest."

Average age, eighteen years. *Extremes of age*, two to fifty years. Children, 14; adults, 22.

Sex.—13 males, 23 females.

"The disease has prevailed in St. Paul and vicinity for eighteen months past, being more frequent during the epidemic of the pure type. It is distinguished from enteric by marked remissions, absence of diarrhœa, tenderness of abdomen, and delirium, and of the rose-colored spots and partial deafness." (Dr. D. W. Hand.)

At Stillwater, "forty-two cases occurred, with great gastric and hepatic disturbance, and disposition to relapse. Miasmatic exhalations are the prolific source, coming from low damp ground, vege-

table and animal debris, etc. They have told on our community at a fearful rate." (Dr. J. K. Reiner.)

"At Hastings, about twenty miles below St. Paul, on the Mississippi, an extensive prevalence and a disposition in ordinary remittent, to lapse into a low enteric form. Paludal influence operating with civic poison the cause." (Dr. C. P. Adams.)

At Red Wing, just above the head of Lake Pepin, less frequent than for years, sporadic and mild.

"At Wabasha, just below Lake Pepin, less of the disease than for twelve years." (Dr. Lincoln.)

At Winona, still lower down the river, 29 cases are reported: ages ten to sixty years. Sex, two thirds females. Deaths, 3; one at fourteen years, of cerebro-spinal meningitis, as a complication; one, aged twenty-five, abortion at five months, followed by coma; one, aged twenty-three, meningitis—all females.

Back from the river, on the prairies, the prevalence has, so far as I learn, been sporadic and unusually mild.

INTERMITTENT AND REMITTENT FEVER.—Shortly after the completion of the report for 1870, the operation of paludal poison as a disease cause began along the Mississippi, and during the year past made a record more marked than ever before since the white settlement. Beginning in the spring, it reached its maximum of influence in mid-summer, and shortly yielded after the coming on of cold.

No intermittent fever is reported in St. Cloud or St. Paul, but the presence of its peculiar cause was apparent in the production of the remittent and entero-malarial forms. The disease was endemic at Stillwater, Hastings, Red Wing (at least 600 cases in a population of 5000), Wabasha (half the population), and Winona. The most marked prevalence has been along the river. In the country twenty to thirty miles back, and along the smaller streams, there has been even less than usual, with the exception of Rochester, "where it was very marked, scarce any febrile attack in which malarial influence was not apparent." (Dr. H. Galloway.) The type has as a rule been tertian, and the attack severest at the outset of the epidemic, *e. g.*, on an island above Red Wing, around and near which we believe were the chief sources of the poison for the town, the first two cases died speedily of congestive chills. The liability to relapse was a characteristic feature of this epidemic. It occurred on the 7th, 14th, and 21st, and even as late as the 42d day. The period of freedom from relapse lengthened as

the season advanced. This malarial influence was felt all winter, and still acts in modifying the operation of other disease cause.

The causes assigned in my last report are all that occur to us as yet. They were intensified by the very low stage of the water, and by the extensive clearing of timber off the islands during the previous winter, thus exposing an unusual extent of the river bottom land to sunlight and air.

CEREBRO-SPINAL MENINGITIS.—At date of reports (December and January last), was sporadic in St. Paul, Stillwater, Wabasha, and Winona. It is now epidemic, I am informed, in Sauk Centre (a very interesting report by Dr. B. R. Palmer is attached), and in other places, and threatens to be so in St. Paul. (Dr. D. W. Hand.)

VARIOLA AND VARIOLOID were introduced into St. Paul from New York in November last. They gradually extended, till, at date of report (January), there had been 36 cases, nearly an equal number of the pure and modified form. Eight deaths are reported. Sporadic cases occurred in other towns, beginning with imported cases. Vaccination and revaccination have been general and successful. The popular belief that this fact is proof of an epidemic tendency to the disease has been of use in overcoming carelessness in opposition to the practice then too general, especially among a portion of the foreign population.

SCARLATINA.—Twice epidemic during the past year in St. Paul; very mild and few deaths. Also at Stillwater, where 22 cases are reported in Dr. Reiner's practice, none fatal.

In Red Wing it began in September, and still continues, at the same time with rubeola. There have been over 300 cases, and very few deaths; 3 deaths are reported from diphtheritic complication. Many cases have been mixed with rubeola, and Dr. Sweney reports 5 cases with varicella. In Pine Island, thirty miles back from the river, 30 cases, 22 mild, 8 severe. "Ages, majority under eight, two over eighteen. Most frequent sequel albuminuria. Deaths: two from purpura hemorrhagica." (Dr. C. Hill.) "At Zumbrota, ten miles nearer the Mississippi, no cases." (Dr. O. H. Hall.)

RUBEOLA.—None up to date of the reports, except at Red Wing and Stillwater. Now (April 27th) it, as well as scarlatina, is epidemic, very mild and rarely fatal. Its worst effects are on very young children, and on depraved diatheses, notably the strumous.

ERYSIPELAS.—Reported epidemic in St. Paul in November and December, 1871. It has reappeared there since, affecting surgical

wounds. It is sporadic elsewhere. In Rochester, fifty miles from the river, "its prevalence is reported greater than at any time since 1864." (Dr. H. Galloway.) At Winona, a few genuine cases are reported.

RHEUMATISM.—More cases of the acute variety are noted than last year. In St. Cloud, 4 cases; Red Wing, 8; Stillwater, 13; Zumbrota, 8 cases in July and August, most of them with cardiac complications, no deaths.

"In St. Paul there has been an unusual prevalence of the subacute muscular type, which is the form the disease in by far the greater number of cases assumes." (Dr. D. W. Hand.)

DYSENTERY.—Very slight and mild prevalence is reported, except at Zumbrota and Pine Island in Goodhue County. In Zumbrota, 36 cases in July and August. In Pine Island, 12 cases in August and September. No causes assigned.

CHOLERA INFANTUM.—No marked general prevalence. In Goodhue County, 13 cases and 2 deaths in Red Wing, 4 cases in Zumbrota.

DISEASES OF THE RESPIRATORY TRACT.—*Effect of climate in inducing diseases of the mucous membrane.* It may be stated as the opinion of the majority of the profession in the State, that the effect is to induce chronic catarrh and some of the non-contagious forms of ophthalmia. Dr. O. H. Hall, resident in a settlement of New England people, gives it as the result of his observation that a very large number of persons from those States who never had catarrh there, develop it here after a short residence. Drs. Lincoln, of Wabasha, and Sweney, of Red Wing, both long resident and careful observers, report a large amount of catarrh developed here which is persistent and obstinate.

Is the catarrh so induced limited to the nares and fauces?—The reply is in general, yes, except in tuberculous diathesis, or in persons suffering from other chronic diseases of the respiratory mucous membrane.

What temperament is most susceptible to its influence?—Not known. Dr. Lincoln, of Wabasha, thinks the lymphatic and strumous, especially among children, and I think this the opinion of the majority. Dr. Flagg, of St. Paul, says nervous and sanguine.

Effect of climate on imported catarrh, laryngitis, bronchitis, or asthma.—Dr. Staples, of Winona, expresses the general opinion as follows: "Favorable. Recovery much more likely to occur than in disease incurred here. There is considerable difference of

opinion as to asthma, caused, I am induced to think, by the influence of locality (nearness or distance from water, etc.)." Dr. Flagg, of St. Paul, observes: "Phthisical patients, having one of these troubles as a complication, not unfrequently undergo some improvement in nutrition and general health during the early part of their residence here, and the throat disorder seems better for a short time, soon to return in all its severity."

Effect of residence in strumous diathesis and phthisis in any of its stages.—There is a decided endorsement of the opinion given in my last report to the Association, that children of this diathesis are benefited by becoming resident here, the earlier in life the better, as are also (though not to the same extent) adults becoming resident before there are any local developments. It is noticed by several who have practised there and here, that there are not so many or severe forms of scrofula as in an equal population in the East.

As to incipient phthisis, including under this head the first marked evidence of tuberculous diseases of the lungs, and excepting those cases in whom, with these symptoms, there is a marked disposition to hæmoptysis, the settled opinion may be stated as follows. Such patients, enabled to come here and live comfortably with body and mind at ease, able to avail themselves of proper exercise out of doors, and to digest their food, and also able to take up their *residence* here, are benefited in the great majority of cases. The effect as a rule in such cases is an *arrest*—not a *cure*, but an arrest—which may be practically final *during residence*, and which in many carefully noted cases has resulted in a cure so far as the *local* disease is concerned. But the caution is given with great unanimity not to *rely* on such a cure so far as to return to the locality where the disease originated, or even to leave this climate. So many cases are on record, in which that change has been speedily followed by rapid redevelopment of the disease, quick decline, and death, that the caution is necessary. The opinion is generally entertained, sustained by facts, that cases prone to frequent inflammatory attacks or to chronic pneumonia do not improve here.

As to well-developed disease, the majority report that residence here by sufferers from abroad is of no benefit, but that the end is so often hastened as to make the change not advisible.

If physicians advising a change of climate for phthisis will take into more frequent and serious consideration the influence of absence from home, friends, accustomed nursing and diet, and the thousand

petty inconveniences, and not infrequent serious exposures, which such change too often implies even for the wealthy, they will be able to prevent great physical and mental suffering, and unnecessary exposure while prolonging the patient's life by allowing him to depart quietly at home. In devotion to *cure*, *prevention* is too often forgotten. In the great majority of cases in the eastern and southern States, a change to this or similar climate for its effect on diathesis or incipient phthisis will be beneficial, but, *as a rule, long residence is* necessary to retain the benefits which the change may have afforded.

APPENDIX A.

SAUK CENTRE, MINNESOTA, April 26, 1872.

DEAR SIR: I have not time to give more than an outline of my observation, and experience. The first cases of cerebro-spinal meningitis which occurred were so sudden in their fatal termination, the patient dying within a few hours of the attack, without time even for getting medical assistance, that I can say nothing further about them than merely to state the fact. They were adult young women, two of them single, one married. The first cases that I saw were children, eight of them attacked at about the same time and in the same neighborhood. In all of them the symptoms were nearly identical, pain in the head, along the spine, and in the articulations of the extremities, in some cases, with swelling, heat and redness of the joints. The neck stiff, and the head drawn back (in two cases the occiput resting on the lower cervical vertebræ); the tongue moist, with a white filmy coating (this on one side only in some of them); pulse full, soft, and slower than natural, often irregular or intermittent; respiration irregular; urine scanty, and of the consistence and color of whitewash. Pain intermittent, and, during the intermission, coma, from which the patient could be roused for a moment to answer questions, when he would relapse into the comatose condition. These cases all occurred in a marshy locality, and all my subsequent bad cases, excepting a few to be traced directly to contagion, occurred under the same circumstances. Since its first appearance the disease has gradually changed in its method of attack, often commencing with pain in a joint, the ankle, the knee, the wrist, or in the bowels or chest, but always ending with violent headache and vomiting. Pain in the neck and frequently in the left arm, alternating with the head. The muscular

contractions and opisthotonos were wanting. Often the whole train of symptoms seem wholly inadequate to the actual mischief brewing, and the patient dies suddenly of paralysis. Among the results are paralysis, hemiplegia, loss of hearing, strabismus, and a general dulness of the mental faculties; in a few cases idiocy. In one case, a boy, aged fifteen years, living at my house, the disease began with pain in the knee, followed by inflammation and suppuration of that joint, and of the ankle and shoulder joints, with gangrenous spots wherever any pressure had been made on the skin, or where his limbs touched each other. Death occurred in about twenty days. This boy had been living at home all winter with his family, in extreme poverty, in a very cold, open house, with poor and insufficient food and clothing. The disease attached him about a week after coming to my house, where his mode of living was entirely and suddenly changed. I may add here, that my dog, a black and tan terrier, took up his quarters upon a buffalo robe which had been used on this boy's bed. He died with all the symptoms of cerebro-spinal meningitis in about a week after.

In the treatment of this disease I am far from boasting of entire success. My cases were all within a circuit of fifteen miles, and (without counting those cases which simulated the complaint, *e. g.* hysteria, etc.) I have treated forty-three well-marked cases of cerebro-spinal meningitis. Of these, I lost seven. In three other cases I had no opportunity to use medical treatment, the patients being in articulo mortis when I saw them. . . . . I know that for eight weeks all my time was taken up among patients with this disease, before a case appeared here, and there have been very few in the village, and they were suddenly fatal. Whatever may be the cause of cerebro-spinal meningitis in other localities, facts seemed to point to a malarious origin here, consequently my treatment has been in that view. The bowels were moved by enemata immediately, followed by calomel in ten or twenty grain doses, with effervescing draughts to allay vomiting. I immediately bathe the feet in warm water, apply mustard plasters to the spine, and after that, dry warmth to the feet and back, which is very grateful to the patient. The animal heat is, in most cases, much below the normal standard. As soon as a remission occurs, I resort to quinine in frequently repeated doses of from three to six grains every three or four hours. Generally, whenever I have been able to introduce a drachm or so before the return of the attack (in the

adult) the next paroxysm has been light, or altogether wanting. In some cases, from the total intermission, I have neglected to enforce the continuance of the quinine, and have been surprised by a terrible recurrence of all the trouble in the third day. Heat, sinapisms, or stimulating applications, such as are at hand in every house, I have found useful. For the pains in the head or elsewhere, morphiæ sulph., in quarter or half grain doses, repeated every hour and a half until relieved. Frequently, I have had astonishingly good results from chloral hydrate in from twenty to forty grain doses, simultaneously with the morphia.

Such is a general outline of treatment with the result of from one-sixteenth to one-nineteenth per cent. of fatality.

Other interesting particulars of individual cases, I am, from want of time, obliged to omit.

Very truly yours,

R. R. PALMER.

RED WING, May 1, 1872.

DEAR DOCTOR: In March, April, May, and June, 1864, cerebro-spinal meningitis was epidemic in this county, sub-epidemic in July and August. When epidemic, over one hundred and fifty well-defined cases were treated. All other diseases, coincident at the time, assumed many of its characteristics.

Symptoms.—They varied greatly. Some patients were stricken down from perfect health; the first evidence being convulsion and coma, death frequently following. In others, a chill succeeded by fever and intense cephalalgia, which symptoms occurred in daily paroxysms or at irregular intervals, a few assuming a tertian type. In others, no evidence was discoverable except slight *malaise* and dulness for four or five days, followed by convulsion, coma, and death. As a rule, however, more or less cephalalgia, soreness of the joints, particularly of the wrists, metacarpal articulation of thumb or great toe, and tenderness of the muscles, preceded the chill. Pressure at cranio-spinal junction caused pain, radiating to the head and face.

During the epidemic there were other nervous functional aberrations, from the lightest to the gravest, and not to be anticipated from the previous history of the case.

Petechiæ were generally present, from the size of flea-bites to purpuritic blotches.

Photophobia, retention of urine, and abdominal pains at times

occurred. In some, a slight chill followed by stupor, from which the patient would recover with violent subsultus, or with paraplegia or deafness, which might be temporary or permanent, and this, too, with very mild antecedents.

Gastric irritability in most cases followed the chill, but was not obstinate or unmanageable. The bowels were generally natural or but slightly costive. The tongue, if changed, was flabby and pale, with a white slimy coating, which became brown and dry if the disease was protracted. Thirst less than natural, appetite impaired or lost. Delirium generally present, at times maniacal, at others mild. Pulse little affected, and scarcely ever tense. Temperature, as a rule, below, rarely above, normal standard. The iris contracted and dilated, at times in the same individual. Strabismus, double vision, and conjunctivitis, with impairment of the senses, frequently noticed.

In a few cases, if a question were asked of a patient no answer would be returned, but a smile, which, as far as muscular adaptation was concerned, was well enough; but the appearance of the eye was that of looking through the questioner to utmost limit of vision. The whole expression of the features was that seen in cases of insidious shock from injuries, more especially severe scalds.

The extreme prostration mentioned by writers did not occur. Convalescence was marked and rapid.

Age.—Chiefly between 1 and 10 years; 10 per cent. between 10 and 25 years; 2 per cent. between 25 and 45 years.

Sex.—Mostly males.

Mortality.—About 10 per cent. Neither locality, occupation, social condition, nor health status appeared to predispose.

Duration.—Extremes, 8 hours to 4 months. Average of recoveries, 6 to 14 days.

Sequelæ.—Paralysis and deafness; recovery from first usual but slow; from last very rare; result, in children, deaf-muteism.

Anatomical characteristics.—Not known; but one post-mortem, and that without definite results.

Etiology.—As an epidemic, governed by the same laws as influence epidemic influenza, but advances more slowly, disappearing and suddenly recurring, having for a cause some peculiar atmospheric condition.

Diagnosis.—In some abrupt cases simulated apoplexy, the initial symptoms of severe exanthemata, or malignant paludal fevers.

During this epidemic, for a brief time, it was mistaken for chorea, hysteria, rheumatism, influenza, and, in a few cases, enteric fever.

Treatment.—Alteratives (mercury, iodine, etc.), antiphlogistics, and bloodletting were useless and hurtful. Cold applications of doubtful utility, except in protracted cases, where they appeared of use. Counter-irritation and friction, as a rule, gave marked relief. Our main reliance was on opium and quinine, given freely at intervals of two and three hours during the intermission. When the periodic character was marked, they scarcely ever failed; and the suspension of their use too soon, frequently involved a recurrence of the disease. A characteristic example in the practice of Dr. A. B. Hawley is given. Boy, aged seven years; fifteen grains quinine daily lessened the violence of the periodic attacks; an increase to thirty grains stopped them—on suspension of the remedy for one week they returned—the quantity of the remedy necessary increased after every relapse, until sixty grains daily effected a cure at the end of four months. The recovery was complete.

A combination of Dover's morphia and camphor was my favorite anodyne, and was freely used when demanded in the disease.

This, with proper attention to the secretions, was our course of treatment.

Yours truly,

WILLIAM W. SWENEY.

REPORT

ON

METEOROLOGY OF NEW JERSEY.

BY

E. M. HUNT, M.D.

VOL. XXIII.—31

REPORT ON METEOROLOGY OF NEW JERSEY.

As a Meteorological Report I cannot do better than to transmit to the Association the condensed results of the accurate observation of Wm. A. Whitehead, of Newark, New Jersey, as given by Dr. Wickes in his report to the New Jersey State Medical Society.

"1. The mean temperature of 1870 (52.67°) was nearly two degrees above the average of the preceding twenty-six years, which was 56.75°. Of the whole series, two only, 1850 and 1853, exceeded it, every month excepting March having had a mean temperature above the average.

"2d. While the maximum temperature (92½°) was exceeded in 14 of the 26, in 23 of the series a lower temperature was experienced, the minimum of the year having been only 5¼°.

"3. The mean temperature of the winter months was 2.76° above the average, of the spring months 0.30° above, of the summer months 2.93° above, and of the autumn months 1.66° above.

"4. That the number of fair days was above the average, and so with the number of days on which snow was observed.

"5. That the quantity of water falling in rain and melted snow was almost identical with that of 1869, and nearly two inches and three-tenths above the average of the preceding twenty-six years. There was a deficiency in the fall of the last four months which left the earth unusually dry at the close of the year. The weather was uniformly cold throughout the winter months, the drought of the autumn and the frozen ground of the winter causing a general drying up of the streams and wells. The atmosphere was much drier than for several years preceding, and the good effect upon the public health apparent."

We hope another year to furnish a fuller meteorological analysis.

REPORT OF THE SECTION

ON

Surgery and Anatomy.

REPORT OF THE SECTION

ON

SURGERY AND ANATOMY.

TUESDAY, May 7th.

THE Section met at 3½ P.M., in the main hall, and, in the absence of the Chairman, Dr. GURDON BUCK, of New York, was called to the chair, which he vacated on the entrance later of Dr. HODGEN.

Dr. J. SOLIS COHEN, of Pennsylvania, exhibited a patient upon whom he had successfully operated, a few months since, for the closure of an enormous cleft in both hard and soft palate, by a modified method, completed in a single operation. The patient was a young girl, some sixteen years of age, in perfect health. The cleft was congenital, one and five-eighths inches in length, and seven-eighths in its broadest diameter, and permitted a free view of the entire glandular tissue of the vault of the pharynx, and of the whole of the pharyngeal extremities of the Eustachian tubes. The operation had been performed by the speaker and Dr. Packard, in a sort of surgical duet, a method which they had found convenient and expeditious in a previous operation. At that time Dr. Cohen had proposed to *split* the edges of the palate, instead of paring them, but had been dissuaded from the attempt by his associate, in view of the callousness of the edges. In the present instance, he had determined to split the edges of the hard palate, instead of making the usual incision along the cleft, thus raising the entire flap from the surface of the bone, and saving a loss of one-eighth inch of material. Dr. Packard immediately proposed continuing the slit into the soft palate also, instead of paring it; and the operation was performed in this way, each gentleman operating on one side. The patient being etherized, the New York mouth-gag was introduced, and the operation expeditiously performed in the

following manner: The edges of the cleft being split lengthwise by a shallow incision, the flap of mucous membrane and periosteum was raised from the hard palate, according to the method of Langenbeck, the blunt and angular rasp, used to detach the periosteum, coming into the cleft through the slits in its edges. A double-cutting knife was introduced into the soft palate, just below the line of incision in the hard palate, and the muscles of the palate divided, after the method of Pollock, by raising and lowering the handle of the knife, and thus sawing with its blade, so as to leave an anterior wound no larger than the blade of the knife. The parts were brought together by several points of wire suture, Langenbeck's needle being used in uniting the flaps from the hard palate, and a semicircular needle, in Schwerdt's forceps, being used for the more movable soft palate. The fine sutures in the hard and soft palate were clamped by a shot on either side of the cleft; the two in the uvula and lowermost portion of the soft palate were clamped by a single shot respectively.

The operation was a marked success, as exhibited by the examination of the patient. Hemorrhage from the denuded bone took place on the first and second days, and was checked by pledgets of lint, saturated in Monsel's solution. These were removed in a day or two, and the parts beneath were granulating nicely. The patient was nourished by feeding her from a spoon. Two or three sutures were removed on the third day; the central suture cut out on the fourth day, leaving a gap comprising the space between the adjacent sutures; and the others were removed at intervals, the last suture being removed on the eighth day. Recovery was prompt, but there remained an irregular opening in the centre of the line of junction, the size of the end of a lead-pencil. This gradually contracted without interference, and at present there was no sign of an opening, and only a depression at that place no larger than the point of a pin.

The points to which Dr. Cohen called attention were these: the benefit gained in this instance by splitting the edges instead of paring them, and thus saving loss of tissue; and the proof that nature is sometimes adequate to close an aperture in the line of union, without interference from knife or caustic.

The doctor stated, in conclusion, that he had imagined an operation which should consist in dividing the flaps of the soft palate vertically, so as to represent flaps analogous to those taken from the hard palate; the anterior flaps being brought together, a raw

surface would be left posteriorly, while a similar raw surface would be left anteriorly at the side of these flaps. These would, he thought, heal nicely, and leave a soft palate large enough to be applied against the wall of the pharynx—an indispensable requisite to distinct articulation. Muscular fibres would exist in all four flaps made in this operation, and thus the contraction of their fibres would effect an occlusion between the upper and lower portions of the pharynx. In the case exhibited, articulation had been much improved, but it could never become perfect, inasmuch as the new palate was too far removed from the pharynx to admit of its being pressed against it by muscular contraction.

Dr. McARTHUR, of Illinois, was not sure that the closure of the cleft by newly-formed bone was due to the periosteum in the flaps, but thought it might be due to the areolar tissue, which under irritation would sometimes develop osteogenetic properties.

Dr. COHEN said there was nothing but the periosteum to produce the bone on the posterior surface of the flaps. Experience had shown that in these cases periosteal flaps did produce bone, and those of mucous membrane alone did not.

A member inquired what was the best age for performing this operation, and the allied operation for harelip. In the case of a boy about fourteen years old, with very wide cleft of the hard palate, upon which he had seen Dr. Sayre operate, the patient was subjected for a year previous to frequent titillation of the throat with a feather. As a consequence he did not cough during the operation, nor during the whole time of recovery; and the result was highly satisfactory, very good voice and articulation being obtained.

Dr. COHEN could reply only from his reading, as this was an isolated case in his own experience. He would himself prefer to wait till the age of ten or eleven years; but Dr. Smith, of England, had operated at eight or nine months. His gag—a kind of bit—enabled him to do this very well; and a similar one had certainly worked admirably in the present case.

Dr. GURDON BUCK, of New York, had, in two cases within the past year, happily applied the method of splitting the edges of the flaps to the lobe of the ear, where it had been slit down by the ear-ring. Instead of paring the edges he split them deeply, and then carried this splitting incision into the angle of the slit, so as to facilitate the turning out of the divided portions. He then joined the two surfaces separately by two sets of sutures, one set

for each surface. Thus a broad surface for adhesion was secured with no loss of substance, and the result was very good. He proposed to try the same plan in some cases of harelip.

Dr. COHEN was glad to have this testimony, from so distinguished a source, to the advantages of the method, which he was not before aware had been previously employed. Dr. Packard had already applied it to harelip in some instances. In cleft palate it was certainly a great point gained if we could not only avoid the sacrifice of tissue, but even absolutely increase the breadth of the flaps by thus drawing a little from either side. In reply to a question, he said that he had used an ordinary scalpel to split the edges, not a knife with bent shaft, and there was no difficulty about it.

Dr. KINLOCH, of South Carolina, believed that the same method had been employed by Mr. Simon in cases of vesico-vaginal fistula, where it was often very important to get a broad adhesive surface. He wished to know whether the sutures were more or less liable to cut out on this plan.

Dr. A. C. POST, of New York, had, a number of years ago, performed an operation upon the same principle in a case of urinary fistula in front of the scrotum, a part where the closure is attended with great difficulty on account of the thinness of the tissues. By securing a broad raw surface in this way, and holding the parts together by a sole-leather splint, he had obtained an excellent union.

Dr. KRACKOWIZER, of New York, said that Dr. Cohen had certainly the advantage of success in his single case; but he thought there were some theoretical objections to it which might be encountered in many cases, perhaps the majority. The configuration of the parts would tend to make both flaps collapse after the incision; and it must be a matter of great difficulty to introduce the sutures so as to make the split edges spread out and bring only the bloody surfaces in contact, leaving nowhere any mucous surface interposed to prevent union. Although some little breadth was gained for the new palate by the operation, still this would be insufficient after all for the purposes of articulation. It must be admitted that this operation was more difficult than the old one, and when it added so little to the function of the palate it seemed hardly advisable to run the greater risk of failure it entailed.

But he doubted if this operation in any form would hold its place more than a couple of years longer. For cosmetic effect it could not be compared with other plastic operations, such as that for harelip. As nothing was gained in appearance and so

little in function, what, he would ask, was the real value of the operation? That the speech was somewhat improved was admitted on all sides, but it remained far from perfect. Artificial palates would improve it far more than this operation, and every five years saw great advances made in their construction. Kingsley's soft-rubber appliance was decidedly superior to anything that preceded it, and half a decade hence we might look for something better still. Why then should we resort to an operation which must preclude its use? We might make an exhibition of surgical skill, it is true, but our patient would be worse off than before.

As to the proper age for operating, he was compelled once to perform this operation on a child perhaps a fortnight old, to save it from death by suffocation. The lower jaw was congenitally so small and receding that the tongue did not find room, and constantly fell back against the epiglottis; so that the child's life was a perpetual struggle to keep from strangling. After the operation, it breathed much easier, but lived only a short time. The fatal issue was owing partly, no doubt, to exhaustion from the operation, but partly also to insufficient nourishment since birth. On post-mortem examination he found that union had taken place at two points, but that gangrene had occurred where two of the sutures were inserted at the junction of the hard palate with the soft.

Dr. MONTROSE A. PALLEN, of St. Louis, said that this mode of splitting the flaps had been several times applied by Dr. Hodgen, of St. Louis, Chairman of the Section, to laceration of the perineum. Dr. Pallen had risen, however, to exhibit the instruments, and describe the method, employed in what had come to be known as "the St. Louis plan" of operating in vesico-vaginal fistula. Not every one had the skill or the opportunities of a Sims or an Emmet; it was desirable, therefore, for the majority of the profession that the operation should be simplified as far as possible.

The instruments exhibited were these: 1. *Scissors*, for paring the edges of the fistula. There are several pairs of these, some straight, others bent flatwise, near the pivot, at various angles, so as to operate with the greatest convenience upon a wound in any position. The special peculiarity of these scissors is that they have but one cutting edge, which is opposed to a square edge of softer material. This is to insure the opposition of the blades so necessary to trimming smoothly the often indurated tissues. They are the invention of Mr. Leslie, an instrument-maker of St. Louis. 2. *Needles*, which are the finest cambric sewing-needles ground to

trocar points. These are threaded with fine but strong silk, doubled so as to make a loop without a knot, through which may be passed the small end of (3) the *suture wire.* This is made of moderately large silver wire, sand-papered to extreme thinness at one extremity, so that its small end, even when doubled through the loop of silk, is no thicker than the fine needle used. The object of this is to allow the wire to follow the thread with perfect ease, while, as it is drawn through, its larger portion plugs up the hole made by the needle so as to prevent any bleeding. 4. The *needle-holder* requires no special mention. 5. The *suture-gauge.* From a handle extends a shaft of flexible copper, terminating in a flattened extremity. This flattened portion has a base, next the shaft, perhaps five-eighths of an inch broad, while its apex is about one-eighth of an inch. It does not taper gradually, but by three or four opposed rectangular notches. This gauge, and we believe also the tapered wire, were invented by Dr. Hodgen. 6. *Forceps,* for seizing and twisting the wire.

In paring the edges of the fistula it is often advisable not to take away the rejected tissue piecemeal, but to remove it as a complete ring, since thus it can be more easily held. The wire having been drawn through both flaps nearly to its thick extremity, it is cut off at the proper length, and the edges of the wound are approximated to the exact degree at which it is desired they may be permanently retained. The suture-gauge is then placed flat upon them in such a manner that it shall just touch the wire on either side at its points of entrance and emergence. The ends of the wire are next seized by the forceps, and twisted as firmly as possible down upon the gauge, which securely protects the tissues from injury. The gauge is now removed, and the relaxation consequent upon this gives sufficient room for swelling. It may be mentioned that, if the same wire is used for more than one suture, it should be freshly annealed in a candle-flame every time it is passed.

In fissures of the neck of the uterus, so common after parturition, the fine needles above described were found to pass with the greatest ease through the hard tissue of the part; and such was the facility with which the edges of the fissure might be at any time approximated by the aid of the suture-gauge, that the speaker was accustomed to allow his patients to walk about immediately after the operation.

Dr. H. KNAPP, of New York, gave a history of the operations for

cataract, describing in detail the various methods which had been successfully in vogue, and demonstrated the special features of the *Linear Mode of Extraction*, for which he claimed superior advantages.

On motion, this paper was referred to the Committee of Publication.

Dr. O. D. POMEROY, of New York, preferred the flap method to the linear, because it was attended with less difficulty and consequently with less hazard.

The Section then adjourned.

WEDNESDAY, May 8th.

The Section met to-day in Horticultural Hall, and was called to order at 3 P.M., by Dr. J. T. HODGEN, Chairman.

Dr. P. R. HOY, of Racine, Wisconsin, read a report of *Four Cases of Fracture of the Neck of the Femur*, illustrated by specimens. It brought out a general discussion on the treatment of these and other fractures of the thigh-bone.

Dr. SAYRE, of New York, asked whether any one present had seen cases of non-union under the use of Buck's extension, and was answered by several in the affirmative. He thought the treatment by extension and counter-extension was carried altogether too far. Every ounce of force applied beyond that necessary to bring the fragments into exact adjustment was injurious; every ounce short of this was insufficient. To Dr. Swinburne was due the credit of showing that when the adjustment was perfect, the muscles formed the best splint to hold the bones in position. The text-books all said that fractured thighs, in adult subjects, must inevitably be shortened; but even Dr. Hamilton had now recanted, and confessed that union might sometimes be obtained without shortening.

The best treatment of fracture within the capsule was that by the triple inclined plane of Dr. Nelson; the patient's body resting upon the first plane, both his thighs upon the second, and both legs upon the third. This relaxed and quieted the psoas, and made the patient perfectly comfortable. No bandage, coaptation-splint, or sand-bag was required. The hole for the fecal and urinary discharges must not be too wide—not more than three or three and one-half inches; for the weight of the body must be supported on the tuberosities of the ischium, which Nature had fitted for that office. Then there would be no bed-sores. If the apparatus were strongly made, a pair of stout fellows could take it and the patient

on their shoulders, and carry him out under the trees, without the least disturbance.

Dr. W. H. MUSSEY, of Cincinnati, had once kept a fracture of the neck under extension for six weeks without obtaining union. He then let up the extension, and put a bandage around the trochanters, and union speedily followed. Subsequently he had treated successfully a number of cases by a double inclined plane made of pillows alone—pillows under the limb, pillows at the small of the back, a pillow for the foot to rest on. The only bandage employed was a roller thrown about the limb and the pillows together, to keep them in place. As to the credit of first teaching the treatment of fractures without other splint than that furnished by the muscles themselves, he believed Dr. Dudley was entitled to it.

Dr. SAYRE. I am very glad, in that case, to give the honor to my home—State of Kentucky. An old woman whom I treated in this way recovered so perfectly that her friends insisted that she had never been hurt, and found nó end of fault with me for having kept her three months away from her work. She died at last, and I have the specimen. I thought it a splendid example of bony union, and so thought every member of the New York Pathological Society, where I presented it, and it was so published. But Dr. Geo. K. Smith, of Brooklyn, who has given so much attention to intracapsular fracture, was present, and asked me if I had boiled the bone. I did that thing the next morning, and found the junction ligamentous and capable of wiggling about to a considerable extent. At the next meeting of the Pathological Society I presented it again, when, behold! it was as firm as ever. The ligament was so short that when dry it was just as good as bone.

Dr. KINLOCH, of South Carolina, thought non-union rarely or never due to the extension employed. If it were caused by this, the limb should be lengthened, which was never the case. With adhesive-plaster extension, the skin would be torn off before the muscles would yield so as to permit lengthening. Non-union was as frequent under the long splint as under the weight and pulley, perhaps more so.

Dr. E. M. MOORE, of New York, said the plan of treatment by extension was as old as Hippocrates, but every now and then it would die out, to be resuscitated after a time. He had watched its recent revival with the greatest interest. It certainly gave better results than the straight splint of Desault; but we had become so

anxious to avoid all shortening that we often put on too much weight. In a transverse fracture, if the limb was kept at its full length, the fragments, though at first in contact, would soon become slightly separated by the absorption of the spicula of bone projecting from their ends; and non-union would ensue. He agreed with Dr. Sayre that cases of this kind would multiply under the prevalent treatment. He had once himself kept a man with broken thigh for five months on his back with a weight to his leg. At the end of that time there was no union; and he got him up, rubbed the ends together and applied short coaptation-splints, and, in the pressure of other matters, left him for three weeks with little attention. He got around on chairs, crutches, etc., and did just as he pleased. No pain or inflammation was excited, and when told to go to bed again he exhibited a thigh an inch shorter than its fellow, and with firm union, which had probably taken place almost at once when the muscles were allowed to press the ends together.

Dr. KINLOCH thought that, if a patient were kept five months on his back, there would be time enough for union to occur and be broken up again by malnutrition and absorption. It was doubtless quite as much the improved general condition consequent upon getting the man up, as the pressure of the fragments together by the muscles, which caused them at last to unite. Turning a patient out of doors would often succeed in producing such a result when everything else had failed.

Dr. A. C. POST, of New York, replied to Dr. Kinloch that he had once got a lengthening of one-eighth of an inch in a boy about four years old, who had broken his thigh through the shaft and been treated by weight and pulley. The extension was never sufficient to cause discomfort; counter-extension simply by raising the foot of the bed. After the patient had walked about some time the limb was no longer than the other. He was very sure of his measurements. Examining and measuring all the compound fractures of the thigh under treatment in the Washington Hospitals, toward the close of the war (where he found Buck's extension giving incomparably the best results), he had discovered one case of slight elongation in an adult. These two were the only cases he had ever seen. That non-union might come from persistent extension was illustrated by its frequency in fractures of the lower end of the humerus, where the patient walked about with his hand in a sling, and the weight of the limb kept the fragments apart.

Dr. SAYRE had seen an instance of the last-mentioned fracture where union had occurred with lengthening.

Dr. BRINTON, of Pennsylvania, had, in a case of fractured thigh in a lad of two years, got one-eighth of an inch lengthened, by accurate measurement; and this was persistent a year later.

Dr. QUIMBY, of New Jersey, asked if the gentlemen were sure these differences in the length of the limbs did not exist before the fracture. He had a child under observation, with one limb one-fourth, or at the least one-eighth, inch shorter than its mate, where he could get no history of accident.

Dr. MCARTHUR, of Illinois, was sceptical about these close measurements. He had been one of six experts called in a case of alleged malpractice, and no two of the six could agree. The most experienced observer would vary an eighth of an inch in his measurements of the same limb on successive days.

Dr. GURDON BUCK, of New York, gave an extended history of the treatment of fractures of the thigh in the New York Hospital, since 1827, concluding with a statement of the results of the method, adopted in 1860, which bears his name. (This is the plan already referred to, which became so popular during the late war, of extension by adhesive plaster, pulley, and weight, with or without an elastic strap between the adhesive strips and the pulley-cord; counter-extension by raising the foot of the bed.) In the first six years of its use the whole number of cases treated was one hundred and forty-nine. Sixty of these were under fifteen years of age, and gave an average shortening, ascertained by measurement, of something less than one-fourth of an inch. About one-third of the number showed no shortening whatever. In the eighty-nine cases over fifteen years of age, the average shortening was a fraction less than half an inch, and eleven of them were not shortened at all. The same treatment was continued up to the closing of the hospital, but the cases since the year 1866 had not been tabulated.

The speaker claimed for this method that it offered the most efficient means of maintaining uninterrupted extension without discomfort to the patient. It was especially adapted to children, of whom he had sometimes at the hospital half a dozen in a row, as happy as if their thighs were not broken. As to counter-extension, anything beyond elevating the foot of the bed was soon abandoned in the New York Hospital, except in rare cases. For

these it was effected by broad bands of adhesive plaster attached to the trunk and to the head of the bedstead.

In all his experience with the method he had met with but one instance of non-union fairly attributable to over-extension. This was the case of a healthy adult, in one of the suburbs of New York, under the charge of a surgeon thoroughly competent and attentive. After continuous extension for nine or ten weeks the bone was not united, and the patient was brought to St. Luke's Hospital. Dr. B. then learned that during the whole time, a weight of more than twenty pounds had been employed. The case proved obstinate. First, the adhesions were thoroughly broken up, the ends of the fragments rubbed together, and the limb replaced in the extended position with a weight of five or six pounds attached, just sufficient to steady it. This failed. Next a drill was introduced through a valvular incision in the soft parts; the ends of the bone were perforated in several places; and the limb was put up in plaster. This also failed. At last gimlets were introduced and allowed to remain for some time, and union, of course with shortening, was effected. The case suggested a rule which he had since followed, not to maintain a heavy weight, with the hope of securing an unshortened limb, beyond the first fortnight. At the end of that time, though the limb might still be short, the weight should be made only moderate.

It must be borne in mind that in fractures of the femur we were not to expect union without shortening as an invariable rule. If any surgeon claimed to obtain it in every case, he could only reply that it was not his own experience; and he had perhaps bestowed as much time and pains as any one upon the treatment of this particular fracture. The amount of shortening might be regarded as in some degree a measure of the violence of the fracturing force. If it were considerable, that force must have been sufficient not only to break the bone, but to displace its ends so much as to leave the fragments at the mercy of the muscles, which would draw them past each other. In that case a greater extending power was necessarily required, but it was not prudent to carry it too far with the expectation of completely overcoming the muscular resistance.

Dr. SAYRE said that his preceptor, Dr. David Green, had taught him the use of adhesive plaster and rubber bands for extension in 1846.

Dr. BUCK claimed no originality for the idea. His House-

Surgeon, Dr. F. D. Lente, had first called his attention to the plan of employing adhesive plaster, as described in the New York Journal of that day, where it was credited to Prof. Crosby. It afforded him no little satisfaction, however, to have done something to popularize the method, which he had been enabled to do by his position in a public institution, and by the hearty co-operation of his colleagues. He felt that it had been instrumental in preventing a great amount of suffering incident to almost every other mode of treatment. Only recently he had been called to a case in the country where a woman had been enduring torture for a week, with her limb upon a double inclined plane. Her delight, when the weight and pulley made her perfectly comfortable, was something to rejoice in.

Dr. GREGORY, of Missouri, thought that elongation of the limb in young subjects, where the fracture was in the lower third of the femur, might be readily explained by increased growth of the epiphysis from fluxion to the part. It was noticeable that, in both the cases of lengthening reported, union had occurred; and he was doubtful whether non-union was ever justly chargeable to over-extension. We were all aware that it might be due to many other causes, some of them obscure. The obstinacy of Dr. Buck's case would seem to imply that there was some other influence at work to prevent repair than the twenty pounds' extension.

Dr. E. M. MOORE said it so happened that the only case of non-union he had seen was one in which there was two inches' shortening, and in which the extension must therefore have been very inadequate. After three months it finally yielded to Malgaigne's spike. Every one in amputating the thigh must have noticed that, after the bone was sawn through, it still hung by the ligamentous tissue along the linea aspera. In the majority of cases of oblique fracture, this tissue was probably not broken across; and to make lengthening possible, it must be either ruptured or stretched. Possibly a steady strain upon it might do the latter. Some gentlemen had smiled at the mention of twenty pounds' extension. He knew a gentleman, vain of his handsome legs, who had borne fifty pounds (weighed and not guessed at), without great discomfort, for three weeks, at the end of which time the shortening was reduced to half an inch. The patient himself called for "more weight, more weight," as he watched the tape lengthening day by day.

Dr. J. H. PACKARD, of Pennsylvania, exhibited a suspension-

apparatus for fractures of the leg. It was simply a light frame of iron, shaped to receive a fracture-box, and suspended at the four corners by two cords, one for each end, the centres of these cords being connected by a third one running over a hook which was hung by a rope from a fixed support above. The doctor remarked that the hook was better than a pulley, since the slight friction of the cord over it gave the patient a comfortable feeling of steadiness in the support, while it did not interfere with his moving the limb at will. For the fixed point of suspension, a staple in the ceiling was convenient, in the poorer class of houses with low-ceiled rooms; but a high ceiling would not serve, as it allowed too much swing. Perfectly free play for the limb, but within a narrow range, was the thing to be secured.

The idea was often entertained that, in order to make use of suspension, we must give up the tried and familiar splints and dressings, and resort to something new and complicated. This, however, was quite unnecessary. For his own part, the speaker was fond of the fracture-box, and he had contrived the present apparatus to meet the case of a patient who had his leg in such a box, and yet required free movement in bed. In connection with the fracture-box, he was in that case employing pasteboard splints and adhesive plaster extension. The same mode of suspension would serve as well, without the fracture-box, for pasteboard splints, or for any form of the "immovable" dressing, such as starch, plaster, or silicate of potassa. For this purpose it would only be necessary to give the frame an additional bar or two, and place in it a paper trough.

Dr. Packard also presented a splint for use after exsection of the knee-joint, or in cases of compound fracture of the limb. It consisted of a straight board, some five inches wide and a little longer than the limb, bevelled and curved at one extremity to fit the buttock, while to its other end an iron hoop was fixed at a slightly obtuse angle, rising high enough to clear the toes, and serving to protect these from the bedclothes as well as for the attachment of bandages. Opposite the wound a piece of the board, its whole breadth and of the proper length, was cut out, and either hinged and buttoned to its place again, or, better, made to slide in with tongues and grooves. The portions of the splint above and below this trap-door were united and held firmly in line by an iron bar on either side, bent upwards into a hoop so as to support the bedclothes. With the proper pads and bandages the splint

was complete. The trap-door gave free access to the wound for dressing, and supported it at other times.

Dr. W. H. MUSSEY, of Ohio, read a paper, entitled *A Case of Vesical Calculi and Polypi of the Prostate.*

Dr. RUSSELL, of Ohio, had once, in removing a stone by the lateral operation, brought out with the forceps a spherical fleshy mass, as large as the first joint of the forefinger, which he supposed to be the prostate gland itself (!). He thought it might very possibly have been seized by the forceps, not within the bladder, but in the cut, which was through the prostate.

Dr. MUSSEY was sure that the polypi in his case had not come from the cut. It was doubtless one of these growths which had first caused the retention of urine. The band discovered crossing the opening was probably due to a false passage which the patient had made with the catheter. He confessed that he had once hurt himself in passing it.

Dr. MOORE, of New York, thought the band might possibly have been a morbid growth from the prostate body, like the tumors removed. The transcendental anatomists had shown that this body was liable, like the uterus, to the development of fibrous tumors.

Dr. MUSSEY read also a paper on *Electrolysis in Cancer.*

Dr. BRONSON, of Massachusetts, wished to know whether the tumor was examined microscopically, and was informed that it had not been. At the time of its removal there was no thought of electrolytic treatment, and it had been lost. Dr. Mussey, however, had not the slighest doubt about his diagnosis. Dr. Bronson remarked that he deemed constitutional treatment of the greatest importance in cancer, and no mention had been made of it in Dr. Mussey's report.

Both of Dr. Mussey's papers were referred to the Committee of Publication.

Dr. EDWARD WARREN, of Maryland, presented a new splint for fracture of the clavicle. It was a frame of wire properly padded, and, though continuous, was described in two parts—a "thoracic portion," fitting the side of the trunk from the crest of the ilium to the axillary space, and a "brachial portion," adapted to the inside of the arm as far as the elbow. The vertical wires of the first portion were bent outwards at the axilla to form the second. The cross-wires in either portion were curved in adaptation to the surface they embraced. The thoracic portion was fixed by straps about the body, one of which crossed, and pressed upon, the lower

end of the scapula of the affected side; the brachial portion was fixed by straps around the arm. Besides these, a strap passed from the front of the axillary bend nearly vertically over the shoulder, across the back, and under and over the sound shoulder, as in a "figure–8," to be buckled to a second strap which passed to meet it from the back of the axillary bend, toward the top of the sound shoulder. This completed the apparâtus. The frame, while firm enough to resist the ordinary strain upon it, could still be bent by the surgeon so as to fit different patients, and the axillary bend could similarly be given such an angle as to maintain the arm in any position desired, from the pendent to the horizontal.

The speaker claimed for this apparatus that it was simple, readily applied, and not readily disarranged; that it kept the fragments perfectly in position, in the same line and on the same plane; and that it was worn with perfect comfort, and left the patient's forearm free for writing, feeding himself, etc., during the whole treatment. It was so close-fitting and compact that under a loose coat its presence would not be noticed. It cost but about six dollars to make, and one would serve for almost any case. He had tried it in a number of instances with complete success, and had been able to demonstrate its efficacy, by presenting a patient under treatment, at the last meeting of the Maryland State Society. Other surgeons had also employed it with equal satisfaction.

The apparatus could also be used advantageously for dislocations of the clavicle, and was especially well adapted to those of its outer end, which there was commonly so much difficulty in keeping in place. The speaker had used it in a dislocation of the sternal end. It was also suited to fractures of the acromion, of the coracoid, of the neck of the scapula, or of the surgical neck of the humerus; and it might readily serve for the very fracture alluded to this afternoon, in which non-union was so frequent, that of the humerus just above the elbow. In humeral fractures it was necessary to have the forearm supported. For this purpose a sling was exhibited, also made of wire, and capable of being firmly attached at one end to the brachial portion of the frame above described, by two long pins sliding into sockets, while the other end was hung by the usual strap about the neck. The doctor had used the apparatus with this attachment in a fracture of the surgical neck of the humerus with great advantage. It had worked admirably, too, in a case of fracture of the middle third, just below the insertion of the deltoid and the coraco-brachialis. Here, from the tendency of

these muscles to elevate the upper fragment, it was necessary to fix the arm horizontally; and this the apparatus accomplished without fatiguing the patient.

Dr. QUIMBY, of New Jersey, had some years ago, in a paper before the New York Academy of Medicine, advocated the treatment of clavicular fracture by adhesive straps. He thought that plan superior to the one just presented in its greater simplicity and its greater firmness of support. The wire would certainly yield a little; adhesive plaster, properly applied, would not.

Dr. E. M. MOORE, of New York, was much pleased with the apparatus exhibited. He had at first thought it was going to be only another modification of the old axillary pad and figure-8 bandage; but closer inspection had satisfied him that it discarded both these ideas, and in so doing agreed with what he had long recognized as an essential principle in the treatment of clavicular fracture. He inclined to think it would work far better than the Desault or the Fox dressing.

As the result of a good deal of thought and experiment, Dr. M. had, as he believed, discovered wherein lay the radical error of the almost universally adopted axillary pad and figure-8 bandage. At the same time he had developed the fundamental principle of treatment, and devised a means of carrying it out. This principle, as he had said at the meeting of the New York State Society in 1870, was to antagonize those fibres of the sterno-cleido-mastoid attached to the upper border of the inner fragment of the clavicle, by the fibres of the great pectoral attached to its lower border. When the bone was broken, as usually, in its middle third, and the shoulder, in obedience to gravity and muscular action, fell into the classic position downward, forward and inward, the inner fragment, as every one knew, would almost invariably ride the outer. But we might lift the shoulder as high as we pleased, the inner fragment would still keep uppermost, owing to the action of the cleido-mastoid, unless we were careful to make tense the clavicular portion of the great pectoral. The axillary pad and the figure-8 bandage, each in its own way, prevented this, as would be seen by a glance at the mode of insertion of the muscle.

By the twist in its fibres, those taking origin from the thorax were inserted high up on the lip of the bicipital groove, while those from the clavicle were inserted fully an inch and a half lower down. Now, the thick upper edge of the wedged-shaped axillary pad came just opposite the insertion of the clavicular fibres. When the

humerus was used as a lever to throw the shoulder outward, on the pad as a fulcrum, the motion at this point would of course be *nil*, and the only fibres of the pectoral put on the stretch would be the thoracic ones inserted higher up. These would simply limit the outward motion of the upper end of the humerus. The axillary pad, then, even if it could be relied upon to meet the indication of drawing the acromial fragment outward, would have no effect to prevent the sternal one from over-riding.

The figure-8 bandage was still worse. As it was drawn tightly across the borders of the axilla, it would bend them, and so practically shorten them and pull the humerus inwards. But the anterior border being formed wholly by the thoracic fibres of the great pectoral, these alone would be made tense by the bending, while the clavicular fibres, just escaping the pressure of the bandage, would be absolutely relaxed by the indrawing of the bone.

How, then, should all the indications be met—the three classic ones, to carry the shoulder upwards, outwards, and backwards, and the fourth, most important of all, to put the clavicular fibres of the pectoral on the stretch? The way to do it was so simple that the wonder was every fool had not thought of it years ago. Throw the elbow back from the shoulder-joint as a fulcrum, and the clavicular fibres of the pectoral, inserted lower and therefore moving through the arc of a larger circle, would, of course, be made tense before the motion was arrested by tension of the thoracic fibres. This same movement would tend also to carry the scapula back upon the chest toward the spine. But the scapula, as it approached the spine, found the ribs more salient, and was pushed backward, taking with it the acromial fragment of the clavicle, and thus drawing it obliquely backwards and outwards in the direction of its length. The only remaining indication, to raise the shoulder, was also thus partially fulfilled, for the scapula, as it was pushed back, tended also to rise; but this might be supplemented by a lift from the elbow.

It was easy enough to put things in place, but the rub came when you tried to keep them there. The supine posture would do it, as long known, but that was simply impracticable. The retentive apparatus should be something obtainable anywhere and capable of the readiest application. After many trials the speaker had finally arrived, as he thought, at the extreme of simplicity. All he wanted was a cravat eight inches wide, and two yards and a

half long. Half a broad sheet, folded cravat-wise, served the purpose very well. Laying this by its centre across his palm, letting the ends hang to the floor, he with his hand seized the patient's elbow on the affected side, and carried the end of the cravat falling next the patient's body up in front of the shoulder of the same side, across the back, and under the sound axilla. The other end was thrown inwards over the patient's forearm, carried thence across the back, and over the sound shoulder, to meet and be tied to the first end. The two extremities of the bandage thus formed one-half of a figure-8 around the sound shoulder, while its middle portion formed the other half of the figure around the forearm and elbow. Hence he had styled this "*the elbow figure*-8." The borders of the affected axilla were not pressed upon, and that side was made perfectly comfortable; but the patient would sometimes complain of galling on the sound side. To complete the dressing, the three or four inches in width of the cravat left loosely embracing the back of the elbow should be smoothly pinned over; and the hand should be slung up by a strip of bandage pinned to the inner edge of the cravat on the affected shoulder, where it overlies the sternal fragment.

Dr. Warren's paper was referred to the Committee of Publication, and the Section adjourned.

THURSDAY, May 9th.

The Section was called to order by the Chairman, at three P. M.

Dr. W. F. PECK, of Iowa, read the history of a case of *Removal of the Upper Portion of the Left Femur for Disease of the Hip-Joint* in a boy six years old.

On motion, the paper was referred to the Committee of Publication.

Dr. HARRISON ALLEN, of Pennsylvania, read a paper, illustrated by drawings, on *The Soft Palate in Health and Disease.*

On motion, the paper was referred to the Committee of Publication.

Dr. CHARLES N. HEWITT, of Minnesota, read a paper entitled *Principles involved in the Treatment of Fractures by the Starch-Bandage, with a Modification of the Dressing.*

The array of "principles" was a long one. Among the practical points were these: In any dressing, the inflexible splint should be placed upon the extensor rather than the flexor surface of a limb, so as to be nearer the bone and to avoid pressure in the

great vessels and nerves. A dressing, generally applicable, must be made of materials that can be found everywhere and can be manipulated with little skill. It must be such that it can be applied once for all by the surgeon; therefore it must accommodate itself to the varying size of the limb, with such aid only as may be rendered by unskilled attendants. It must not confine the patient to his bed or to the house.

The dangers shared by the ordinary starch bandage with the other forms of "the movable" dressing were mentioned, and the speaker then described his own modification. It consisted in starching only the overlapping ends of the many-tailed bandage employed, the central portion applied to the flexor surface of the limb being left free from stiffening. The unstarched part of the muslin would stretch if the limb swelled; and, when the swelling went down and the bandage became loose, a roller thrown around would mould it again to the limb, the unstiffened part falling into wrinkles or folds.

In illustration of his method, the doctor related four cases which had prospered under it—one of fracture of both leg-bones; one of severe contusion and fracture just above the ankle-joint; one of simple fracture of the thigh, where the patient was on crutches the eighth day; and one of compound fracture close above the knee.

Dr. J. M. KELLER, of Kentucky, recited a remarkable case which had come under his care a year ago. A boy eight years old fell seventy feet, but the fall was broken by the railing of a staircase, so that he was not killed outright. The doctor saw him almost immediately, and found the right radius and ulna with a multiple fracture extending from within an inch of the wrist to within the same distance of the elbow; the right humerus broken near the elbow and again near the shoulder; the right femur broken in its lower third; the right tibia and fibula badly comminuted, the fracture of the former involving the ankle-joint; four or five ribs broken; and (we believe) some other breaks, besides the bruises.

Of course the first business was to resuscitate the child and quiet his pain. He was placed in the most comfortable position, and kept under anæsthetics and opiates. The limbs were left exposed to the air, and cold water applications alone were employed for sixty-five or seventy hours. Then a fixed starch dressing was applied, made not of muslin but of paper. First the limbs were enveloped in cotton wadding, over which was drawn, for the lower

extremity, the leg of a pair of knit drawers, and for the upper the sleeve of an undershirt. Then slips of manilla paper were cut, from half an inch to an inch wide, and long enough to encircle the limb and overlap at the ends. These were covered with starch on both sides, and applied in the usual manner over the wadding and knit stuff. Four or five courses were laid on, beginning each time at the fingers and toes. To keep the radius and ulna apart, the forearm was held semi-prone and the paper pressed in between the bones, so that when dry it formed a perfectly moulded splint for the purpose. The lower limbs, after dressing, were placed on a triple inclined plane.

About the end of the fourth week the dressing was removed, and the boy presented to his parents as sound as before he was hurt, with perfect motion of both the injured limbs. Though union seemed everywhere complete, yet the starched paper was reapplied as a matter of safety. At the expiration of seven weeks it was taken off for good. The broken lower extremity was then found, on repeated trials, to measure one-fourth inch longer than its fellow. The doctor had attributed this not to actual elongation of the injured limb, but to wasting of the sound one, from its long disuse; for, owing to the rib-fractures on the left side, and the pain caused by any movement of that limb, it had got less exercise than the one done up in starch.

The speaker had referred to this case to attest his confidence in the immovable starch apparatus, and also to show the superiority of that form of it here employed. He thought paper surpassed muslin as much as the common starch bandage did every other kind of splint. Nothing else, he believed, would have secured perfect motion in that ankle-joint.

Dr. A. C. POST, of New York, had had considerable experience with the starch bandage, and thought surgeons were too apt to lose sight of the dangers attending its application very soon after the injury. In the New York Hospital he had seen two broken legs mortify from this cause, necessitating amputation. In one case under his own charge, the circulation was so much obstructed that he had to relieve it by slitting down the bandage. Effects like these had led him to suspend the application of the immovable dressing until the traumatic inflammation had subsided, and to use, for the first week or two, carved splints or the fracture-box.

Dr. QUIMBY, of New Jersey, had seen it necessary to remove the bandage to prevent gangrene. Buck's extension was safer for

the general profession, but this, like other niceties, should be left to experts.

Dr. KELLER said that with the paper dressing it was easier than with the cloth to make little trap-doors, whether for ventilation or to see what was going on inside. He would not apply any immovable apparatus until inflammation had subsided.

Dr. KINLOCH, of South Carolina, thought the chief advantage of the immovable dressing was that it could be applied so speedily as to free the patient at once from restraint. Only one agent, by its rapid hardening, met the indications perfectly, and that was plaster-of-Paris; when we had this at hand, it was foolish to wait thirty-six hours or longer for starch to dry. The dressing was applicable even to limbs considerably shortened, since they could be brought to their length under chloroform, and held so until the plaster set. The Doctor then explained in detail the mode of application.

Dr. NEWMAN, of New York, was strongly impressed with the importance of the last speaker's remarks. He thought the dressing was sometimes unjustly blamed for gangrene incidental to the injury.

Dr. QUIMBY reiterated his cautions against a dressing that would shut the limb from sight. He had seen bad results from the plaster splint in two instances where it had been well applied by men of skill.

On motion, Dr. Hewitt's paper was referred to the Committee of Publication.

Dr. S. B. MERKEL, of Pennsylvania, introduced to the section, George Thomas, a colored man who could play such queer tricks with his heart and his belly that Profs. Pancoast and Gross had found this case worthy of examination, and the latter had hinted that he was probably in league with the devil. He was born in Brazil and raised in London; had spent some time in Germany and at Paris, where, as at London, he had attracted scientific attention; and he had now taken up his abode at Frederick City, Maryland. He claimed that he could stop his heart, "throw" it into different parts of the abdomen, and "roll" the latter about the navel. The last peculiarity had been discovered by his mother when he was six months old. He got his living by exhibiting himself, and seemed anxious for a while about his pay; but, satisfied at length that the hat would not be empty, he lifted the curtain and opened the show.

First he made the abdominal wall undulate by a peristaltoid movement of the recti from above downward, there being about one and a half, or possibly two and a half, waves visible at once. The motion became very rapid, and was kept up for a minute or more. (He said he could do it all day.) Then he reversed the action, sending the undulations from below upward; and thus he alternated several times. Next he "threw his heart" into the belly, and a swelling like a phantom tumor appeared above the crest of the right or the left ilium at will. Finally he "stopped his heart," until several observers said they could neither hear nor feel it.

Voted that a committee be appointed to retire and examine the case, and report to the Section before its adjournment. The Chair appointed Drs. E. M. Moore, Moses, Allen, Quimby, and McDowell.

The paper on *Four Cases of Fractures of the Femur*, presented yesterday by Dr. P. R. Hoy, of Wisconsin, having been revised by the author, was now re-read by the Secretary for action by the Section. A vote of thanks was passed.

Dr. HOY presented a tonsillotome of his own invention, which he had used for many years. It was a pair of strong scissors having both blades curved edgewise, like curved bistouries or the concave blade of a costotome.

Dr. BRONSON, of Massachusetts, related a recent case in his practice, of compound dislocation of the tibia from the astragalus, together with compound comminuted fracture of the fibula, in a lad fourteen years old, thrown from his horse. The wound was washed out, a number of detached fragments of the fibula were removed, the dislocation was reduced, and adhesive straps and cold-water dressings were applied. The patient was suffering severely from shock, and it was several hours before reaction could be established. The case progressed well, and the boy recovered with perfect motion of the joint. He was fed well from the date of the accident to the end of treatment, and was stimulated for a number of days. The doctor believed that to this, more than to anything else, the favorable result was due. He had known several such cases die in the Massachusetts General Hospital within the last four or five years; and he believed it conceded that they had erred in not sustaining the patients sufficiently during the first fortnight.

Dr. GARRISH, of New York, related a case of nævus maternus over the anterior fontanelle. It was noteworthy only from its

situation, and was cured by vaccination at the fourth month, when it had grown from the size of a pea at first, to that of a walnut.

Dr. WATERMAN, of Indiana, reported two cases of shell or solid shot wound of the thigh. Both were flesh wounds.

Dr. WALKER, of Illinois, related a case of mammary cancer. An American lady, forty-one years old, first noticed on the 12th of May, 1871, a small hard nodule in the left breast. It was then attended with no pain or inconvenience. A month later she consulted a cancer-doctor, who applied some caustic and had charge of the case until the 1st of December. At that time the patient came into Dr. Walker's hands, and he found that a slough had been produced as large as the fist. Surrounding this was a fungous growth which the cancer-doctor had assured the patient consisted of healthy granulations, but which was in reality cancerous.

The speaker amputated the entire breast, after which progress was favorable and healing rapid, until the space uncicatrized was no larger than a dime, and even this might perhaps have healed but for the irritation of the clothing. Nine weeks after the operation, there appeared two prominences near the left border of the sternum. They were removed at once, and the wound healed kindly. Three weeks later a large tumor was developed in the lower border of the cicatrix of the first wound, and this was removed. In all, five operations had been made; and it was noticeable that the new tumors were developed each time, after an interval a week or ten days shorter than their predecessors had been. The woman had gained thirty-five pounds, and showed no sign whatever of cachexia, and no derangement of any of the glands. The doctor wished to know whether this rapid recurrence was common where there was no cachexia.

Dr. WASHINGTON L. ATLEE, of Pennsylvania. I have had some experience in the removal of cancerous breasts, and have been in general quite successful. It strikes me that, in the case related, as there is no cachexia, and the patient is doing well, the cancer ought to be got out of the system. There has been no mention made of the general treatment.

Dr. WALKER. The general treatment has been a tonic one of iron and quinine, and she has taken two bottles of cundurango. (Laughter.)

Dr. ATLEE. I think the general treatment a point of very great importance, and without it I have very little confidence in the

surgical treatment of these cases. The best *cundurango* we can use in the general treatment of any form of cancer is arsenic. My experience with arsenic is unusually large, and each year has increased my confidence in it. I have now patients in the city—and if it had occurred to me, I could have brought you four or five—whose breasts have been amputated from five to twenty-five years, and who are examples of the protective power of arsenic, and of its extinguishment of the cancer-cell.

Twenty-five years ago a lady presented herself to me with a large breast of soft cancer, which we denominated fungus hæmatodes, because the great mushroom mass, almost black, looked ready to burst and let the patient bleed to death. I had no idea that she could be saved; but I put her immediately upon small doses of Fowler's solution—the maximum being three drops three times a day—and, when her system was thoroughly saturated with it, I extirpated the breast. It healed up readily; and, according to my observation, the wound for extirpation of cancer commonly heals more quickly than a like wound under other circumstances. I kept her under the influence of arsenic for one year after the cicatrization; and to this day, she is a living example of perfect freedom from cancer.

Perhaps six or seven years ago, a teacher at the House of Refuge had an enormous breast, with an ulcer the size of my open hand. The case had been submitted to the best surgeons of the city, and pronounced incurable. Professors Gross, Pancoast, and Agnew all refused to amputate. I put her upon arsenic, and immediately removed the breast; and up to a very late period there had been no return of the disease. For the last few months I have not heard from her. She continued to use the arsenic for three months after the amputation.

Five years ago I removed a scirrhous cancer from a breast, which healed kindly under the constitutional treatment by arsenic. The woman remained free from disease about one year. Then it returned under the arm, and was cut out, and the arsenic treatment continued. There have been three returns since, the last operation being about three months ago; but, instead of becoming more frequent, these recurrences are taking place at longer and longer intervals. The constitutional condition of the patient is improving; her cachexia disappearing; and I think the cancer-cell will be entirely extinguished.

If the gentleman will try the arsenic treatment in the case he has

reported, I believe he will find, in the course of time, that he will extinguish the cancer-cell. I said my maximum dose is three drops of Fowler's solution. If this produces any irritation of the stomach, or any of the specific effects of arsenic, I reduce the quantity to the point of toleration, and there maintain its action unceasingly.

Some of the gentlemen present may recall a case, which I reported a number of years ago, of epithelial cancer of the lip, where seven operations were performed, the whole face mutilated, and a new mouth constructed. The experiment distinctly proved the influence of arsenic. Dr. Pancoast saw the case in consultation with me, on the occasion of the first operation, and said it was of no use to operate; there was already enlargement of the sublingual gland and of the parotid. But I removed the growth; and, under the action of arsenic, the man was protected for about six months from a recurrence. Then the disease returned and was extirpated; and so for several times afterward. Now, just in proportion as his system was charged with the arsenic, just in that proportion did the return of the disease diminish in frequency. At length it was delayed for eighteen months. The patient had taken the arsenic for one year after his last operation, and six months after he stopped it, the disease reappeared. It was then removed, and once again. The man is still living, I believe, still taking arsenic, and determined never again to leave it off; for while he clings to it he is safe from cancer.

Dr. BRONSON, of Massachusetts, asked whether, when the tumor returned in the cicatrix, Dr. Atlee would remove it at once, or try to check its growth by the arsenic?

Dr. ATLEE would certainly not wait, but would cut it out before it got bigger than a pea.

Dr. BRONSON. I was called two weeks ago to see a case where cancer had reappeared in the cicatrix after the whole breast had been removed. There are three distinct deposits the size of pigeons' eggs, and so deeply seated between the ribs that I believe removal is impossible. The ribs themselves are involved, and probably the pleura. The woman is simply taking anodynes and preparing to die. Now would arsenic be of any benefit in such a case?

Dr. ATLEE. In answer to that question, I would state that the woman would probably be benefited, not cured. I do not think arsenic will cure cancer, but I do believe it will protect the patient from the cachexia, and prolong life, and add to its comfort.

Another point. I think that so soon as you place the patient under the habitual use of anodynes, you lose in some measure the benefit of the arsenic. In all chronic diseases I think we are apt to make the mistake of a too free use of anodynes, and that they interfere with the treatment.

Dr. MYERS, of Indiana, asked if cancer was ever especially prevalent in certain districts. It had seemed to him to be so in his own.

Dr. HAUGHTON, of Indiana, asked Dr. Atlee how he had reached the conclusion that arsenic would destroy the cancer-cell. Was it by the microscope or by clinical experience?

Dr. ATLEE. I have no theory on this matter. If I treat a case of cancer with arsenic, and see no return for twenty-five years; and if I find that without this treatment the disease will invariably return, I have a right to conclude that that cancer-cell, which pervaded the system, has been extinguished by the use of arsenic. How it is done I don't pretend to know.

Dr. JOHN L. ATLEE, of Pennsylvania. I don't wish to start a family quarrel with my brother; but I confess that the first case he related, of twenty-five years ago, is one in which I think he may have made an error of diagnosis. Some six or seven years ago a woman was brought to me with a disease of the right breast, which I am bound to believe was chronic mammary tumor, as described by Sir Astley Cooper; though I am aware that is a very rare disease. Perhaps it is commoner in its slighter development, but it is rare in the state of advanced progress, when it assumes the form of fungus hæmatodes as closely as any two diseases can resemble each other. In this case there protruded from the breast a fungous mass as large as a small cabbage-head, made up of granulations, which wept from a pint to a quart of serous fluid every twenty-four hours. It had been seen by several surgeons of Philadelphia, who declared it incurable. I told the patient I would not pronounce it malignant, as it might be the chronic mammary tumor in a condition of excessive development; and that I would undertake its extirpation. I did so, and the woman is living and has had no return. Although I gave her arsenic, I have never to this day been satisfied that she had malignant disease. Now, the case first mentioned by my brother seems very similar to this.

Dr. W. L. ATLEE. You gave arsenic. That settles the matter, to my mind.

In reply to remarks by Dr. Haughton on the pathology of cancer, Dr. W. L. ATLEE said:—

I think there is no doubt that cancer is sometimes a local disease, and not a blood-disease, in its origin, and that it may become a blood-disease after it has existed as a local one. But in either event, and whether or not arsenic will destroy the cancer-cell under the microscope, I do not see that the results of its therapeutic action are affected. May I ask the gentleman how that cancer-cell is formed; what produces it? Cancer is not always a hereditary disease; it originates in the very best constitutions. There must be an action, therefore, that makes the cell; and if you can alter that action, then the cell will not be made. And if you can take away the whole body of cancer-cells in a tumor while the disease is still local, and then alter the action of the system so that no more such cells are deposited, I say the cancer-cell is extinguished by the treatment.

Dr. RUSSELL cited a number of cases where tumors, diagnosticated as malignant, had not recurred since their removal, from ten to fifteen years ago. They must therefore have been examples of local disease. No special remedy had been used, but nutrition had been carefully looked after.

The Special Committee on the case of George Thomas now returned, and its Chairman reported as follows:

Dr. MOORE. We have made a very careful examination of this case, but have had no time to put our report in writing.

First, we directed our attention to the heart. We find the heart itself very large, and the main arteries also greatly distended. The impulse of the abdominal aorta is very readily and very strongly felt when the subject is lying upon the table. The arteries of the wrist are abnormally large.

When the boy undertakes to suspend the action of the heart, we find that action growing less, and less, and less, until it becomes imperceptible both to the ear and to the finger, showing certainly a very great diminution in its force.

With reference to the alleged transposition of the heart from point to point, we observe these facts: When the attempt is made to "throw the heart," as he says, upon the left side of the abdomen, the right side is seen to become very much indented, and the left side to become a little extended. But we also note that there is a suspension of respiration, and a state of powerful tension of the whole of the muscular system. Synchronous with all this we find

a very decided increase of the heart-sound over the tumor, while the ear of a second observer is kept upon the thorax, and the sound is still heard over the normal position of the heart. We observe similar phenomena, simply reversed, when he attempts to throw the heart upon the right side.

These are the facts. Our inferences from them are, perhaps, of no more value than would be those of any one else.

It is possible that, by the drawing downward of the diaphragm, the pericardium may be so elongated and narrowed, as actually to compress the heart from the sides. It may also be supposed that, besides this mechanical action, there is an element of will acting in some peculiar way upon the heart through the nervous system.

With regard to the act of "throwing the heart" into the abdomen, as is claimed, that claim is by no means admitted. We have stated to you the fact, however, that there is an increase of the sound over the tumor; and this seems to us to be developed as a result of the extraordinary muscular tension. It is easy to understand, I think, that the compression of the abdomen, under this strain of its muscles, would have the effect of bringing the abdominal walls, the spleen, and the heart into very close relation with each other, and of increasing greatly the facility of transmitting sound. We are disposed to think this the true explanation, since the heart is still to be heard at its normal position at the same time that its sounds are so distinct below.

As to the peculiar action of "rolling the belly," it seems to me the result of prolonged training, commenced in early life. This has enormously developed the recti muscles, so that when relaxed they feel like a great mass of dough under the fingers, and has given them a power of vermicular motion precisely like that of a snake or an eel. Indeed, I am not sure but this case may throw a little light upon some speculations of the transcendental anatomists. One of these, as you know, is that the lineæ transversæ of the recti are the rudimentary homologues in man of the abdominal ribs of some lower animals—all we have left of them. Now these give an opportunity for each of the short muscles between them to act by itself; and by bringing them successively into action, the vermicular motion is produced.

One word more. There is no motion of the chest in breathing, or scarcely any. You tell the boy to take a long inspiration, and he immediately expands the abdomen into a great tumor, while the thorax remains perfectly quiet. This shows the wonderful action

of his diaphragm—even more wonderful than the power of, and control over, the other muscles of the abdomen.

Dr. HAUGHTON asked whether the sound in the abdomen might not be due to the pulsations of the abdominal aorta.

Dr. MOORE. We thought of that, and it is possibly so.

Dr. HOY had examined Mr. Grew, the man without a sternum; and he could suspend the heart's action for a short time by his will.

Dr. Moore's report was adopted, and he was requested to reduce its points to writing for the Committee of Publication.

At seven o'clock the Section adjourned, and referred its Minutes to the Association.

ON THE

RECENT ADVANCES IN THE OPERATIONS

FOR

CATARACT.

BY

H. KNAPP, M.D.,

OF NEW YORK.

ON THE RECENT ADVANCES IN THE OPERATIONS FOR CATARACT.

If I venture to speak before this Association on the recent advances in the operations for cataract, I do so because the opinion of the profession on this subject appears to be more unsettled than a sufficient knowledge and appreciation of facts would justify. Regarding a reactionary movement, the starting-point of which in this country, I am sorry to say, is the otherwise so progressive city of New York, it would seem as if no advances had been made in cataract operation since Daviel, in 1750, introduced the extraction through a corneal flap section.

We may endeavor to determine the merits of an operative procedure by theoretical reasoning, but the question will ultimately be decided by the test of prolonged experience, *i. e.* the evidence by statistics. Certainly, statistical tables may not be true to the last figure, the difference of the principles according to which they are made up may not or only reservedly allow their comparison, they may be wrongly interpreted, and thus render it difficult to arrive at the truth; but after all they are the best means to *approach* to the truth.

It is not sufficient, at the present day, to speak of successful and unsuccessful operations only. We want to know to what fraction the normal acuity of vision (V=1) has been restored. A fully available table should indicate the vision for each case, as has been done by a good many operators. For the sake of brevity only, it has of late become customary to range the results obtained into three classes: good or perfect, moderate, and none or failures. Among the first group are placed all those patients who regain sight enough to read ordinary print, which equals $V=\frac{1}{1}^{1}_{0}$ to V=1. To the second group belong those patients who can read only coarse print or find their way alone: $V=\frac{1}{1}^{1}_{1}$ to $V=\frac{1}{2}\frac{1}{0}\frac{1}{0}$. The third

group, failures, are such cases as obtain either no available sight or no sight at all. The standard of perfect result has formerly been held higher, namely $\frac{1}{3}$, $\frac{1}{6}$ or $\frac{1}{4}$, and more. But $\frac{1}{4}$ is unnecessarily high, because it means that the finest diamond print can be read. Graefe should not be cited as an advocate of the one or the other mode of classification, since at different times of his life he materially changed the standard of perfect results. Futhermore, he never gave detailed statistics of his cases, least of all on flap extraction.

I am sure you will agree with me in calling every case of cataract operation in which the patient can read ordinary type (Snellen $\text{II}\frac{\text{I}}{\text{II}}$, Jæger 4 or 5) a good or perfect result, it being sufficient for all ordinary purposes; when this result is obtainable, no patient, in my opinion, should be exposed to the risk of a more hazardous operation for the sake of getting still better sight.

All the attempts at advancing the treatment of cataract during the last ten years may be said to have started from the following principle: "*sufficient sight* for the greatest number." Reclination was completely thrown overboard, its failures amounting to about 50 per cent. *Discision* for soft cataracts of young people—for which the suction method has found an improved revival in England—and *extraction* are the only methods now in practice. I will here speak of extraction only, as it exhibits, more than discision, the progress made in this department.

A careful study of the *causes of failure* of flap extraction preceded and originated the modern movement of raising the rate of success obtainable in cataract operations.

A prominent cause of failure in the ordinary flap extraction is *iritis* and its consequences. It was considered of traumatic origin, and therefore, the piece of iris over which the cataract had to slip, was excised before or after the expulsion of the lens. The flap extraction was combined with *iridectomy*, and in the hands of all operators who had skill enough to perform both operations neatly, a greater rate of success was the result of this combination. This observation is now generally admitted as being true, and extraction is at present usually combined with iridectomy. But some surgeons say it is a mutilation. If it were only that, I should think it a trifle compared with the greater safety it gives to the extraction. It has another real disadvantage: it makes the eccentric vision materially worse. To cite an example:—

A lady came to me complaining of the poor result of an opera-

tion for cataract. It had been a downward flap with a broad iridectomy. Everything looked satisfactory and the lady could read Jæger No. 1. I told her she should be content, the eye having well recovered, and she being able to read the finest type. That is all very well, she replied, but I cannot go up and down stairs or walk about without the greatest uncertainty.

She was right, her eccentric vision was very imperfect. But mind, it was a downward flap, and that an upward iridectomy is less prejudicial to the eccentric vision. This case and many others that I have seen convinced me long ago, that extraction with iridectomy should *not* be made *downwards*.

The *size* of the section having evidently a great influence on the healing, there was, for a short time, a tendency to make the section no larger than that required for a broad iridectomy, and to make it with a lance-shaped knife. A full sized lens could, of course, not as a whole pass through so small an opening, it had to be broken up and "*scooped out*" piecemeal. The majority of these operations proved unsatisfactory; a good deal of bruising being done, the lens not being fully removed, and the eyes being permanently injured or destroyed by irido-cyclitic action.

If, therefore, the size of the section could not with safety be reduced, its *location* might be bettered. It was placed out of the cornea into the "scleral border," a tissue less sensitive of injuries than the corneal substance. Jul. Jacobson made a broad downward flap in the limbus conjunctivæ, and excised the iris freely. He lost fewer cases than any of his predecessors.

Then a new principle was introduced by A. Von Graefe; he operated likewise in the scleral border, and excised a broad piece of iris, but his section did not produce much of a flap, it rather followed the line of the greatest circle on the globe. He called it a *linear extraction*, and in order to give it this direction, he had to use a very small knife. This method combines all the merits of the others. The section being an upper one, it afforded the advantages of iridectomy without its great disadvantages. It is situated in the sclerotic, avoiding the more irritable tissue of the cornea. It is materially smaller, but as efficient as an ordinary flap section, letting a full sized lens escape entire. (This point Dr. K. rendered obvious by exhibiting a model, consisting of a large India-rubber ball upon which a linear section and a flap section, both uniting the same points on the globe, were drawn. The linear section, following a great circle, was conspicuously smaller

than the flap section following a circle of latitude.) It has furthermore the great advantage of closing better than the flap. Considering all these favorable circumstances, we need not be surprised in finding that the rate of success of this operation was higher than that of any other method. The great majority of experienced operators have adopted it, and practise it almost exclusively.

Another operation originated by Dr. A. Weber, of Darmstadt, has theoretically some advantages over Graefe's. The section is made with a broad lance-shaped knife, so curved on the lower surface that the section is likewise linear, viz., in a greatest circle track, with equal extent of the inner lip of the section and the outer lip of the section, and, therefore, the wound on the whole is smaller than Graefe's, but not less available. Graefe's section, traversing the lamellæ of the sclero-corneal tissue perpendicularly, is subject to a slight patency, whereas Weber's section, passing obliquely through the lamellæ, is closed admirably by the intra-ocular pressure. Furthermore, the exit of the lens is easier in Weber's operation than in Graefe's. On account of these merits, I have always had a predilection for Weber's operation, and have practised it about three or four dozen times, after having repeatedly seen it performed by its originator. It has, however, such practical drawbacks that I have reluctantly given it up, and returned to Graefe's. These drawbacks are the following: It is almost impossible to get perfectly sharp, reliable Weber's knives. They have too many curves to be well made. They are so broad that the wound they make is more or less bruised. The incision is very frequently too small for cataracts of ordinary size, or the point of the knife engages in the lens capsule, the iris, or the cornea at the opposite side of the section. It is not easy to overcome all these difficulties, and, as the advantage of this method over Graefe's are not great, it is natural that it should not have many advocates.

Having come to the conclusion that Graefe's method, at this day, is the best, our endeavors must be to cultivate it by paying attention to the most appropriate execution of its details, with a view not only to obtain a complete mastery of its technicalities, but to perfect its weak points. Graefe began this work, and when he died he left the method materially better than it was when he first described it. I do not intend here to review the modifications he made, all of which were of great importance. I will only mention his excellent rules for the excision of the iris, and the improved manœuvre for the expulsion of the lens.

As an example to show in what way the operation is capable of, and needs further, improvement, I will say a few words on the *laceration of the anterior capsule*. Watching, day after day, and two or three times every day, the reactive processes which take place after cataract extraction, I came to the conclusion that a great many of these processes proceeded from the anterior capsule. In the report of the first hundred of extractions I had performed according to Graefe's method, I wrote (*Graefe's Arch.*, vol. xiii. No. 1, p. 85, etc., 1867) that the man who found a procedure to *remove*, in a safe manner, the anterior capsule, would contribute to Graefe's operation the greatest improvement of which it was still capable. Further observations specially directed to this point have only strengthened my belief in that respect. The remaining capsule and fragments of lens are, if iridectomy has been correctly performed, *almost the only cause of iritis* after cataract extraction. Should this proposition appear exaggerated, I may corroborate it by the fact, that iritis, so frequent after ordinary and Graefe's extractions, is of the rarest occurrence after extractions of the lens together with the capsule. I do not repeat merely the experience of Pagenstecher, who has practised such extractions by the hundred, but can confirm it from my own, though more limited experience. This seems to prove that in the majority of cases, iritis, after extraction, is not a primary inflammation, but induced by irritation from the capsule and its contents.

In addition to iritis, the capsule may produce different degrees of *keratitis*. I believe I do not err in assuming that partial suppurative keratitis, which may become general, is caused by shreds of the anterior capsule lying between the lips of the wound. In one case I could, with oblique light, immediately after the operation, demonstrate a small, folded opacity, which, in all probability, was a portion of the anterior capsule hanging from the section, about half a line into the otherwise jet black pupil. Everything else looking satisfactory, I did not attempt to remove it. Partial suppuration, producing hypopyon, distinctly proceeded from this little piece of capsule, caused iritis and suppurative inflammation of the adjacent part of the cornea.

The *anterior capsule*, with the cells which line its back surface and equatorial region, is capable of primary inflammation, *plastic and suppurative capsulitis*. Years ago I described unmistakable cases of this affection, and prolonged observation has made me

familiar with it. This, however, is not the place to enumerate its symptoms.

Many operators, guided by the same ideas, have endeavored to remove the anterior capsule. When it was thickened in its centre, Graefe used to lacerate it peripherically, and to extract the thickened centre with delicate curved anatomical forceps. Some other instruments, either like forceps, or hooks, or rakes, have been devised for that purpose. Adolph Weber employed a double hook, and passed it through the capsule around the edges of the coloboma, even beyond these edges under the remaining part of the iris. This was done in order to lacerate the capsule as extensively as possible, and, if my memory serves me, also to extract a part of it. Graefe adopted this method, but used the kystotome. I have followed the same plan for the last five years, without passing the edge of the pricker under the iris. A quadrangular piece of capsule, corresponding to the artificial pupil, is thus circumcised. Passing, then, the kystotome to the lowest portion of the coloboma, I endeavored to extract the circumcised piece of capsule. Sometimes I could demonstrate it under the microscope; at others, the kystotome came out without grasping the capsule, but the capsule was expelled with the cataract. In the great majority of the cases, I could, the next day after the operation, show that the circumscribed portion of capsule had really been removed, the corresponding part of the pupil being perfectly black, while the remaining part of the anterior capsule, and especially its cut edges, were, in oblique light, distinctly discernible by their grayish color. This mode of removing the essential part of the anterior capsule succeeds so frequently that, until very lately, I have only thought of perfecting myself in its execution rather than having recourse to some other device. Only those cases, and especially the one to which I have alluded, where portions of the anterior capsule were less impacted between the edges of the section, and originated inflammatory action after operations which apparently had been irreproachably performed, made me think of the necessity of obtaining a method by which the anterior capsule might be as demonstrably excised as the iris.

The cases in which a portion of the anterior capsule was removed—they may amount to about four-fifths of the cases I have operated on during the last twelve months—are distinguished by the smoothness of the healing process, and the sharpness of

the vision obtained, S=$\frac{2}{3}$ and 1 being not at all rare. I must, however, add that the anterior capsule having been removed in the manner described, its *remaining portion is still liable to inflame.* I have observed this distinctly, and judge, from the few cases I have watched, that the inflammation mostly begins at the superior edge of the coloboma, and travels all around it, first descending on one side, then passing along the lower horizontal edge to the other side of the coloboma. The nature of this inflammation may be either plastic or suppurative.

If there is so much mischief produced by the capsule, you may ask why not adopt the method of extracting the lens together with the capsule. This old procedure has recently found some warm advocates, but, to my mind, will never be generally adopted. The main objection to it is that we possess no sure method of extracting the lens together with the unbroken capsule. With Pagenstecher's method the capsule ruptures in one-fourth or one-fifth of the cases, leaving the capsule and a good deal of the lens in the eye. This most frequently happens in cases in which the cataracts are uncomplicated and the eyes comparatively healthiest, affording the best prognosis by extraction with opening of the capsule. As a method of extraction in hypermature, tremulous, cystic, and similar kinds of cataract, the extraction with the capsule, I trust, will hold its ground, but never become a general or even a preferred method.

Having thus passed in review the ideas leading to the recent advances in the operation for cataract, you might expect positive evidence that these modern operative procedures are really lasting improvements, and not merely short-lived innovations. Such evidence could be furnished by extensive statistics only, for which this seems not to be the proper place. As all I have said here was grounded on personal experience, I may be allowed to conclude by a remark having the same foundation. In my apprenticeship and travels, which were unusually long and varied, I found that the modern methods of operating for cataract yielded decidedly better results than the former methods, sanitary conditions of the patients and operative skill, of course, being equal. My own personal experience leads me to the same conclusion, even if I make a liberal allowance to the possession of greater skill now than in former years.

CASE

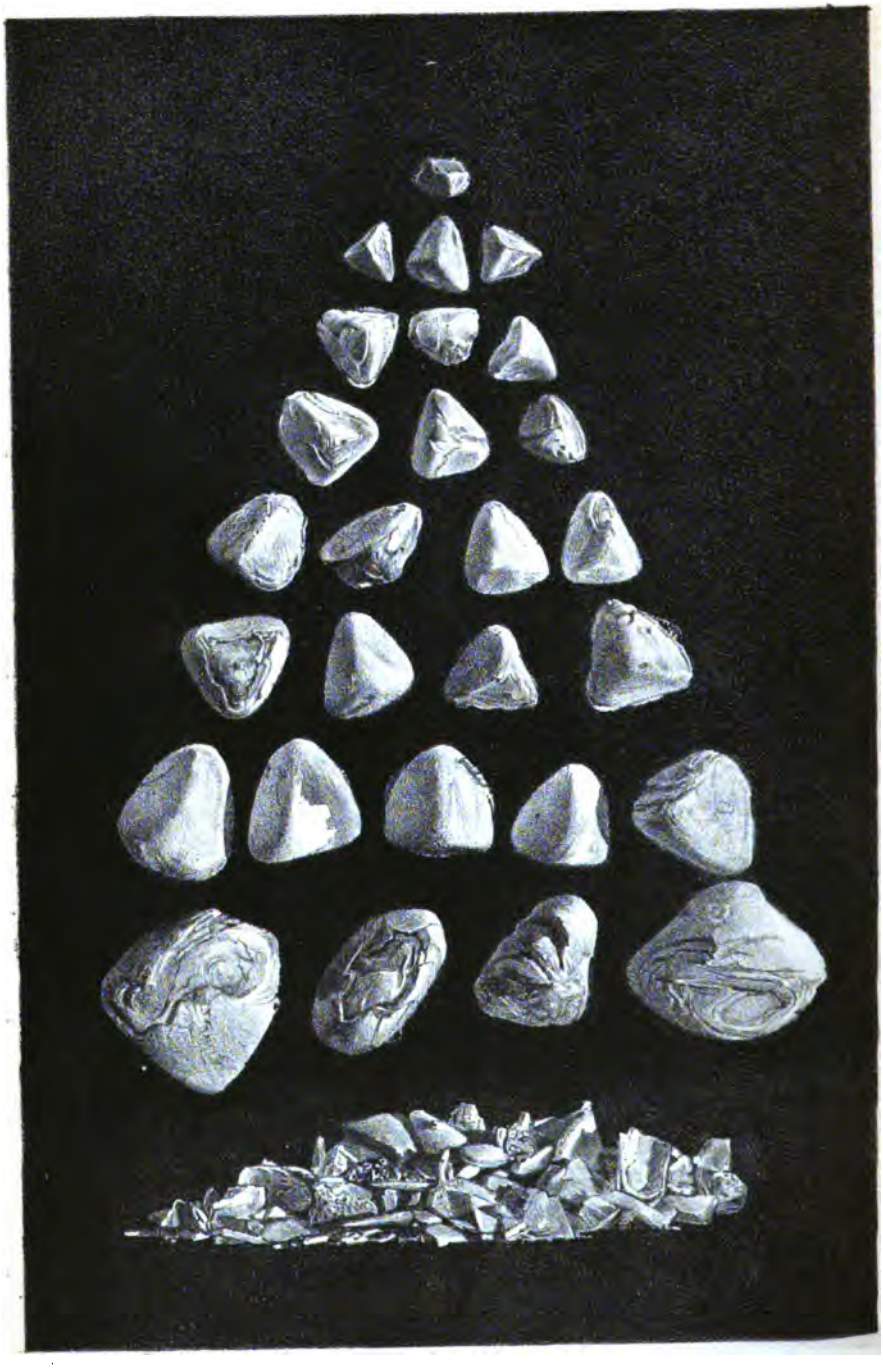
OF

VESICAL CALCULI WITH POLYPI OF THE PROSTATE GLAND.

BY

W. H. MUSSEY, M.D.,

OF CINCINNATI.



CASE OF VESICAL CALCULI WITH POLYPI OF THE PROSTATE GLAND.

I PRESENT to you these specimens and photographs, with the following account of the case.

Mr. P., of Southern Kentucky, aged fifty-six years, has had retention of urine since the year 1865. From no assignable cause, he was suddenly seized with a stoppage of water, and resorted to the use of a silver catheter which he had in the house, and which had belonged to his father, who was a physician. He continued the use of the instrument himself, occasionally having the advice of a physician. Three years since he had a violent attack of cystitis, with unusual suffering. He called on Dr. King, who administered to his relief, so that he was able to pass his water without the intervention of the catheter for a short time; from this time he began to pass small calculi with his water, round like coriander seeds; they would pass through the eye of the catheter with most every evacuation of the bladder, so that "hundreds" were thus passed. During this interval, he resorted to every conceivable mode of treatment to dissolve the calculi in the bladder, using all the "solvents," so-called, that were recommended in books of old date, and in the more recent *light literature* of the day. The sufferings increased, and the patient concluded to have lithotomy performed.

On March 28, 1872, I detected stone on sounding. On the 30th I operated by the bi-lateral method. After entering the bladder, with my forceps, and seizing a stone, I encountered some difficulty in extracting, which I could not account for on the theory of a too small incision. I dropped the stone, and exploring with my finger, found a band stretched across the prostate, under which I could press my finger to the extent of the nail. Supposing this to be the cause of obstruction I ruptured it, and proceeded to the removal of

the stone. There had been considerable difficulty in seizing the stone in the first place, now it was easily removed; and, noticing by its shape that there must be a nest remaining, I continued removing till a large number of stones, with a quantity of fragments, were deposited in the wash-basin; occasionally there would be some difficulty in dislodging the stones from their bed, and then a difficulty in removing the larger ones. I explored again, and found several prominences upon the prostate gland from the size of a buckshot to that of a small filbert. I worked some of these off with my finger, and some I seized with forceps and removed, when there was no further difficulty in the extraction. The position of the deposit was not on the floor of the bladder, but in the fundus, where the stones were packed, as the facets indicate, like a pavement, and they will account for the difficulty in seizing the first stone.

The number of perfectly formed stones is twenty-seven, besides the debris, the whole weighing six ounces and two scruples or 2900 grains; the largest weighing 340 grains, and the smallest 4 grains.

I exhibit six of the polypi, the larger number being lost in the washings. My friend, Dr. N. P. Dandridge, has examined them by the microscope, and pronounces the character to be of the nature of the prostate gland. I have never seen this complication in any of my father's numerous cases, or in my own, which nearly equal his in numbers. The patient had a complete convalescence.

ON

TREATMENT OF CANCER BY ELECTROLYSIS.

BY

W. H. MUSSEY, M.D.,

CINCINNATI.

ON TREATMENT OF CANCER BY ELECTROLYSIS.

THE remarkable success of Dr. W. B. Neftel, of New York, in the treatment of a cancer of the breast, with galvanism, as published by him, has induced me to make trial of that method in different forms of cancer. I cannot claim, for the majority of the cases, such results as should settle in the minds of the profession the doubts that exist as to the utility of the treatment; but my various experiences have convinced me that a large number of cases can be cured by a judicious selection of cases, and a discriminating application of the agent employed.

Passing over the details of cases, I will say that I have observed that the encephaloid variety of malignant disease has appeared the most intractable, and the scirrhus form the least so.

There are undoubtedly stages and conditions of the disease that forbid the hope of any permanent benefit, though relief from pain and suffering may be secured in nearly all cases, with a great mitigation of symptoms in the worst cases.

The essentials to success are—

1. A careful appreciation of the agent, and the methods of application.
2. Patience and perseverance on the part of the operator and on that of the patient.

I have employed various batteries, and find Remak's, made by Kinger and Hirseman, of Berlin, the most constant in current, but less powerful for surgical purposes than the battery manufactured by Mr. Curt W. Meyer, of New York, which is a modification of Smee's elements. The Stöhrer battery, Bunsen's elements, made by Mr. Drescher, of New York, is less constant than the latter, and much more troublesome to handle and keep in repair. The one I have, was one of the first made in this country, and has been greatly improved upon.

One case which I have treated has convinced me that malignant disease can be cured by electrolysis; other cases, now under treatment, especially two of scirrhus of the breast, where the diseased part has *almost* disappeared, re-inforce my convictions.

I now present to your inspection a photograph and a wax model of a hand, on the dorsum of which you will notice a cicatrix. This model, taken by Dr. Nardyz, a member of this Association, here present, is absolutely perfect.

The case is that of a German woman, aged thirty-six years, a seamstress. She called upon me in March, 1870, with the following history and conditions: One year before (1869), she discovered a swelling upon the dorsum of the right hand, this had been preceded by a pain in the whole arm and shoulder; the painfulness increased with the increase of the size of the tumor; in a few months she consulted a physician, who observed the case for six months, which continued to enlarge in spite of treatment; it was lanced, and a quantity of blood and water was discharged. Amputation of the hand was proposed. On her consulting me, I found a tumor in the centre of the dorsum of the hand 2¾ inches in the longitudinal measurement, and 1¾ inches in the transverse direction, elevated above the level from ¼ to ¾ of an inch. The entire hand was greatly enlarged.

My diagnosis was osteo-encephaloid cancer. This was also the opinion of the late Professor Blackman.

As my experience at this time with electrolysis in encephaloid disease had not been satisfactory, I proceeded to extirpate the diseased part, and made an incision in the centre of the tumor over the position of the middle metacarpal bone; dissected the skin to either side, sacrificing the extensor tendon of the middle finger, but saving the other tendons. On opening the shell of the tumor, there was a profuse hemorrhage, and a mass of an encephaloid character was removed. The middle metacarpal bone had disappeared, and the metacarpal bones on either side were eroded and bare, having lost the half of their substance. These were scraped thoroughly, and the entire cavity divested of everything of a suspicious character. The wound was thoroughly cauterized with pure carbolic acid, and filled with lint. The palm of the hand was very largely infiltrated and hard.

From March 7, the date of the operation, to the 22d, the wound was dressed with lint, soaked in a solution of 10 grains of carbolic acid to the ounce of water. It was noticed the third day,

when the lint was removed, that there had been a development of encephaloid granulations, which increased so rapidly that I decided to use electrolysis, and applied three needles to the mass attached to the negative pole of the battery; the positive pole was placed in the palm of the hand, 6 cups were used for five minutes, 8 cups for two minutes, and 10 cups for five minutes—as much as could be borne by the patient. The next day the growth was larger than the day previous, and I placed an electrode 1¼ inches length by ¼ inch wide upon the mass, and gradually increased the current from 8 to 16 cups for fifteen minutes; the disk was covered with one layer of lint. After four days I used the electrode bare, and in a week used a still larger electrode, round, 1 inch by ½ diameter, which I pressed into the mass, but the tumor was only shrunken a little; and the next day after, it would be as large as before; after a week of this treatment, the tumor had gained in size. I then took a smaller electrode, ¾ inches by $\frac{7}{16}$, and thrust it deep into the bottom of the cavity, and continued the application for twenty-five minutes; after a week I told the patient that I had gained a little, but could not promise to benefit her; I would try it as long as she would submit to it. She replied, that she would do anything to save her hand, and continued to come, and in a week longer, by daily application of the full power of the battery (16 cups) for twenty-five minutes, the diminution of the growth was so great that I prognosticated a suppression of the disease. From the 1st of May to July, the applications were made every second day, at which date there was cicatrization; the patient called only twice a week. In August the patient was using the hand to sew, the thimble being used upon the middle finger. Her arm was greatly fatigued, and the electricity relieved it, she coming once or twice a week till November 15; since which there has been no occasion for any application. In November, 1870, I had the photograph taken which I now present to you; a model in wax was taken by Dr. Nardyz, but the mould being broken I had a second one made last week.

It is now nearly two years (twenty-two months) since the cicatrization, and sixteen months since any application has been made to the case.

REMOVAL

OF THE

UPPER PORTION OF THE LEFT FEMUR FOR DISEASE OF THE HIP-JOINT.

BY

W. F. PECK, M.D.,

PROF. SURGERY, MEDICAL DEPARTMENT IOWA STATE UNIVERSITY.

REMOVAL OF THE UPPER PORTION OF THE LEFT FEMUR FOR DISEASE OF THE HIP-JOINT.

A. M., male, æt. 6 years, native of Iowa, son of healthy parents, and enjoyed good health until he reached the age of three years, when he was supposed to have received a kick from a playmate on the left thigh. From the date of the injury he commenced to favor the limb in walking, and the lameness was attributed by his attendants to a contusion of the soft parts, and was considered of only temporary duration. He continued to suffer from soreness and pain in the vicinity of left hip-joint, and down the thigh, until about the middle of November, 1868, when a swelling began to show itself on the inner and posterior portion of the joint, and continued to increase in size, accompanying which there was a general depreciating derangement of the system, until February, 1869, when it was opened and caused to discharge not less than eight ounces of purulent fluid. General supportive, unmechanical treatment was administered. The orifice made in opening the abscess continued to discharge sanious matter until July, 1869, when another swelling appeared on the inner and anterior portion of the hip, which opened spontaneously. In October, 1869, another swelling, giving evidence of fluctuation, showed itself, and was opened and discharged a large quantity of pus, not materially different from that which was evacuated on the other occasions referred to. In July and August, 1870, two more abscesses appeared and were similarly treated. At the date when the last collections of pus were discharged, the patient ceased to walk even on crutches, and thereafter became greatly emaciated, suffering from time to time from abscesses around the joint, all of which

opened spontaneously, producing permanent fistulæ, communicating with the femur both above and below the insertion of the capsular ligament. No bone at any time escaped from any of the fistulous openings. He had been treated by different physicians, but to no purpose, and on November 7, 1871, he was brought to the clinic of the Medical Department, of the Iowa State University, when he exhibited the following condition.

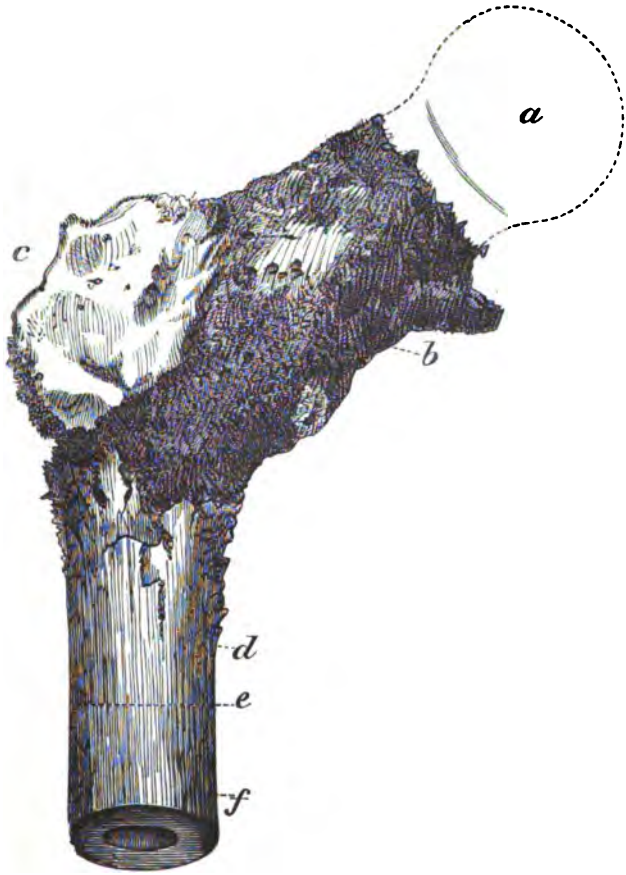
Small in stature, nervous temperament, much emaciated, and of a leucocythemic color. The countenance showed that the patient had suffered severely from pain and exhaustive discharges. The digestive functions were imperfectly performed, there being scarcely any appetite, associated with decided inactivity of the bowels. The left hip was extensively swollen, the thigh being contracted upon the abdomen, and the leg upon the thigh, and no ability on the part of the patient to extend either leg or thigh, and, in fact, pressure gave him much pain. Clonic spasms had been present since early in the commencement of the disease. The number of sinuses surrounding the joint, and communicating with the intra- and extracapsular portion of the femur, were in all twenty-two, many of them were quite tortuous, but dead bone could be reached through most of them. On the inner side of the upper portion of the thigh, where adduction was very great, there was considerable sloughing of tissue down to the adductor muscles. So great was the suffering of the patient that a satisfactory examination could not be made, except under the influence of ether.

An operation, explorative in character, for the removal of dead bone, was advised, and accordingly on November 10, 1871, assisted by Dr. Pryce and several other medical men, I removed, before the class, *four and a half inches* of the upper portion of the femur. The head of the bone was destroyed completely by absorption and discharge; and the periosteum, for two or more inches below the trochanter major, was found separated from the bone. The first section made by the chain saw (see "*e*," Fig. 1) did not remove all of the necrosed bone, so a second section was made, and healthy tissue was left in the proximal extremity of the femoral shaft. The entire substance of the bone, except those portions indicated by "*c*" and "*f*," Fig. 1, was carious, and most of it in a condition of actual necrosis. The acetabulum was also necrosed, but the disease was superficially confined.

After the operation, the patient was placed in the wire breeches

used by Sayre. The wound was filled with oakum saturated in carbolate of glycerine (carbolic acid f℥j, glycerine f℥iv), and each day the wound was syringed out with warm water, containing carbolic acid. The patient was treated internally, medically, and dietetically, in a supportive manner. He continued to improve,

Fig. 1.



suffering for about two weeks during convalescence from diarrhœa, and on March 5, 1872, he was able to walk with the aid of a crutch and cane. In April the cane was only needed to assist progression. Although four and a half inches of bone, making due allowance for that portion removed before the operation, was removed, measure-

Fig. 2.

ment only exhibits three and a half inches of shortening. Fig. 2 represents to some extent his present appearance. It is wanting in completeness, because the patient could not be persuaded to conform to the requirements in having it taken.

REMARKS

UPON THE

SOFT PALATE AND ADJACENT PARTS IN HEALTH AND DISEASE.

BY

HARRISON ALLEN, M.D.,

PHILADELPHIA.

DIVISIONS OF SUBJECT.

I. The Soft Palate seen from the Oro-Pharynx, p. 538.
- (*a.*) The Palato-Glossal Fold and Tonsil, p. 539.
- (*b.*) The Uvula, p. 542.
- (*c.*) The Præ-Coronoid Space, p. 543.
- (*d.*) The Palato-Pharyngeal Fold, p. 545.

II. The Soft Palate seen from the Naso-Pharynx, 548.
- (*a.*) The Palato-Salpingal Fold, 548.

III. The Relation existing between the Mechanism of the Soft Palate and its Superficial Veins, p. 549.

IV. Remarks upon naming of the parts associated with the Soft Palate, p. 556.

REMARKS UPON THE SOFT PALATE AND ADJACENT PARTS IN HEALTH AND DISEASE.

THE object of this communication is to invite a closer scrutiny than has hitherto been given to the relations existing between the mechanism of the soft palate and the distribution of some of its diseases, as well as to suggest the employment of an improved nomenclature.

In introducing my subject I cannot do better than quote the definition of the soft palate given us by Cuvier.[1] "In man and mammals the soft palate forms a variety of muscular membranous valve suspended to the posterior border of the ledge of the same name, and elevated toward the posterior nares at the moment of the passage of food from the mouth into the pharynx."

The soft palate presents for examination two surfaces which appear within different regions; the first, the antero-inferior, within the mouth; the second, the postero-superior, within the pharynx.

When at rest, as in expiration, the soft palate is held in its position (obliquely downward and backward) by two pairs of tractors, the palato-glossal and the palato-pharyngeal muscles. When elevated, as in inspiration (the above muscles retaining their tensile power), the soft palate is acted upon by a pair of superior tractors, the levato-palatal muscles. When it is raised, as in deglutition or gagging, the act becomes more complicated. It is now initiated by the last-named muscles raising the muscular portion of the palate to a level with the aponeurotic portion. Succeeding this, the palato-pharyngeal muscles contract, elevate the pharynx, and tend to constrict its median portion. This stage may be divided as follows: First, the elevation of the body of the soft palate accompanied with a slight passive narrowing of the palato-glossal muscles (Dzondi), and the apposition of the hinder free end against

[1] Leçons d'Anat. Comp., tom. iii. p. 281.

the posterior wall of the pharynx. Secondly, the approximation of the palato-pharyngeal muscles, and the production of the angle of their convergence toward the middle of the muscular division of the soft palate. Thirdly, the contraction of the uvular muscles.

At the completion of the act the oro-pharynx is widened superiorly, while the tonsils, no longer seen in a foreshortened profile, tend to be drawn deep within the oro-pharynx. The naso-pharynx is, of course, closed.

The motions of the soft palate are indirectly influenced by the pharyngeal constrictors and the muscles of the glosso-hyoid series. It determines the patency of the Eustachian tubes. Within its range of influences are the acts of breathing, swallowing, smelling, sucking, and speaking.

If it be correct to say that those regions of the body are naturally defined which include muscles of the same related functions, it is seen that in the soft palate we have no unimportant part, but the centre of a region of the mucous tract toward which converge muscles arising from such remote points as the base of the skull and the thyroid cartilage.

I.—The soft palate seen from the oro-pharynx.

When the lower jaw is depressed and the lips widely separated, the soft palate being at rest, the following features are noticeable.

Fig. 1.

Fig. 1. A diagrammatic view of the soft palate from in front. (Modified from Luschka.)
A. Vessels as ordinarily seen about the raphe. These are described, p. 552. Other vessels are noticed passing downwards from the palato-glossal fold to the floor of the mouth.
B. The præ-coronoid space. The inner limit of this space is too sharply defined in the figure.

(*a.*) *The Palato-glossal Fold and Tonsil.* — The palato-glossal fold is a duplication of mucous membrane corresponding to the middle and free third of the muscle of the same name. It is of a crescentic shape, and originates by a root-like extremity from the sides of the base of the tongue opposite to the vallecular region of the dorsum, and ascends to the body of the soft palate. It is lost as it approaches the raphe about two lines above the base of the uvula. It is of a much darker color than the soft palate proper, and resembles in this respect the hue of the mucous lining of the pharynx. The edge of the fold is ordinarily directed obliquely toward the mouth, and would, if produced, join its fellow at an acute angle.[1]

When the tonsil is engorged, this fold may be much wider. It now appears as though spread out over the tonsil. Immediately to

Fig. 2.

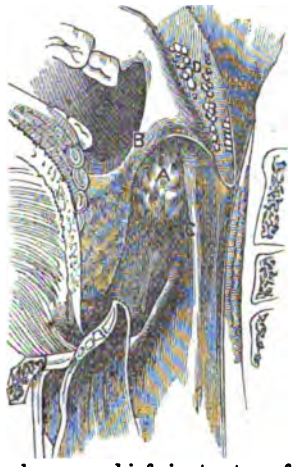


Fig. 2. Lateral view of the pharynx and inferior tractors of the soft palate. (Luschka.)
A. The tonsil.
B. The palato-glossal fold.
C. The palato-pharyngeal fold.
A fourth duplication of mucous membrane is seen passing upwards from the lateral border of the epiglottis to the side of the pharynx.

[1] The point of junction of the palato-glossal fold with the tongue is occasionally the seat of mucous patches, caused, in all probability, by the extreme tension of the fold in question, when associated with tonsillitis. The tongue, as is known, can be imperfectly protruded in tonsillitis, in consequence of the tension on the already stretched palato-glossal folds. May we not find in the frequency with which fissures are met with on the edges of the tongue—well back near the insertion of the fold—a similar cause to that assigned to the localization of mucous patches? I have notes of one case of syphilitic angina remarkable for the presence of a well-defined ulcer at the base of the palato-glossal fold of the left side.

the outer side of the fold and occupying the space between it and the mucous membrane leading from the lower jaw to the soft palate, is a depression lined with a thin mucous membrane similar to that found upon the floor of the mouth. (See Figs. 1 and 5.) This is of a pale bluish-white color and is almost constantly marked by a relatively large vein whose trunk would appear to communicate with a vein lying at the side of the tongue.

A probe can be readily introduced beneath the palato-glossal fold; thus determining the freedom of connection between it and the tonsil. This space I have occasionally found completely crammed with pellets of solid tonsillar secretion. These have been easily removed by a curved blunt probe, such as a strabismus hook. The fold should always be drawn forwards in examination of the tonsil. Tonsillitis causes the fold to become tense, especially in those examples which show a tendency to protrusion of this body into the inter-tonsillar space.

Submucous infiltration may linger at and beneath this fold after the subsidence of the inflammation. Luschka[1] mentions the occurrence of abscess in this region. The peri-adenitic infiltration, which has been studied so carefully in the inguinal and the submaxillary regions, has not been dwelt upon to the extent it deserves in the disorders incident to the tonsils. Practitioners have occasion to notice the lingering fulness of the retro-maxillary space after an attack of tonsillitis. Among the sequelæ of syphilitic angina there are few more constant and obstinate.

In three cases of chronic infiltration of the tonsil in tertiary angina, I have found the palato-glossal fold obliterated (unfolded as above noticed) while the face of the gland was turned backward and could be seen only by reflected light (Fig. 3). In two of the three cases, a linear ulcer was found in the angle between the posterior edge of the reflexed gland and the lateral wall of the pharynx.[2]

[1] Luschka Die Anatomie des Menschen, I. 198.

[2] Tourtual (p. 77) describes a pair of tonsil-like glands situated near the point where the anterior and posterior folds unite with the soft palate. Two round openings of $\frac{1}{6}'''$ in diameter were seen one on either side of the uvula. He had never observed this condition but once, viz., in the body of a man aged thirty-two, who had died of pneumonia. The tonsils were found much enlarged. I have met with a similar expression of a symmetrical tonsil-like gland placed on either side of the uvula. They were each the size of a barleycorn. The patient, a young man of twenty, was the subject of enlargement of the tonsil, the right gland having been excised.

The two palato-glossal folds are ordinarily called the anterior half arches. In the normal throat, it is true, that the upper third

Fig. 3.

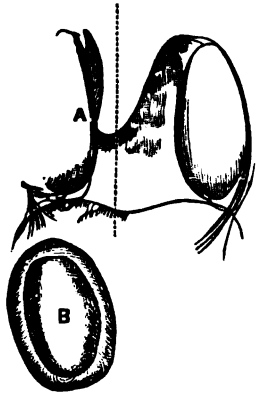


Fig. 3. A. Right tonsil as seen by unaided vision.
B. The image of posterior face of same as reflected in the rhinoscope.

at least of an arch would result where the course of the terminal fibres of the palato-glossal muscles defined by a connecting fold across the raphe of the soft palate. But in fact it is only in those cases where, owing to defective power of the palato-pharyngei that the folds of the same name are faintly pronounced, or are invisible, that the anterior folds unite in an arch as above described. The outline of the uvula, ordinarily forming a part of the figure of the space between the posterior folds, may be transferred to what, under these exceptional circumstances, is only a union of the two "half-arches;" while the body of the soft palate sags forward, and assumes a more vertical position in the mouth. The name *constrictor isthmii faucium* is sometimes given to the palato-glossal folds; and the impression received that the muscles of the same name narrow, by a sphincter like action, the oro-pharyngeal aperture. If this function is ever a marked one it is so in infancy[1] (at which time the soft palate is relatively longer[2]) rather than in adult age.

[1] Analogy suggests an important primary relationship which exists between the act of sucking and that of swallowing. The reader is referred to that mechanism by which the nipple of the female marsupial mammal is retained in the mouth of the offspring, and to the manner by which the milk is compelled to flow (independently of voluntary effort) along the oro-pharyngeal tract to the œsophagus.

[2] Tourtual, p. 66.

Not infrequently a fold of membrane is seen running obliquely downwards and backwards across the tonsillar space, usually immediately below the inferior border of the tonsil. When, associated with this condition, the tonsil is swollen, it appears as though bound down in part by this band. The fold is more often seen in cases where the tonsil is atrophied. At times it is continuous with the palato-epiglottic fold, or terminates in the lower portion of the palato-pharyngeal fold. See diagrammatic representation, Fig. 4.

Fig. 4.

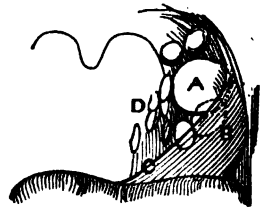


Fig. 4. A diagrammatic view of the left side of soft palate, with the tonsil and accompanying glands in position.

A. The tonsil.

B. The lower portion of tonsillar space exposed by representing the tongue as depressed.

C. The adventitious fold described in the text extending obliquely downwards and inwards to join either of the two folds as indicated.

D. The posterior wall of the pharynx with lentil shaped swellings about the orifices of tubular glands.

(*b.*) *The Uvula.*—This body is so conspicuous a feature of the soft palate, that little of novelty remains to be said of it. It may be briefly mentioned that the uvula is very frequently twisted, or inclined to one or the other side; that it may become indurated from long-standing infiltration, and instead of contracting at the last stage of the act of deglutition is tilted forward into the mouth; that the frequency of ulcerations at the side of the uvula at or near the base is due to the contact of the tonsils, which have become so enlarged as to press upon and if bearing ulcers at the time, to inoculate the uvula at the point of contact; that, probably from a similar cause, the grayish deposit of a recent angina will be transmitted from the palate to the uvula after the manner described.

In the course of the examinations upon which this communication rests, three examples of congenital cleft of the uvula were met with, two of which were complete. I have seen one case where from ulceration the right lateral border had long since been destroyed, and the uvula carried permanently over to the left side of

the median line, where it remained lodged at about the apex of the corresponding tonsillar space.

(*c.*) *Præ-Coronoid Space.*—The soft palate has, by its union with the tongue through the palato-glossal fold, an important relation to the lower jaw. (Figs. 1 and 5.) This relation is not of the same value in all individuals; and in some it does not exist at all. Persons with deep mouths, such as negroes, have it less pronounced than those with shallow mouths. Jaws with prominent angles yield the peculiarity less decidedly than where the angles are receding. In an average case, the mucous membrane covering the anterior aspect of the soft palate, while it extends to the tongue along the palato-glossal fold, merges at the same time into the gum tissue of the lower jaw and the floor of the mouth.

Fig. 5.

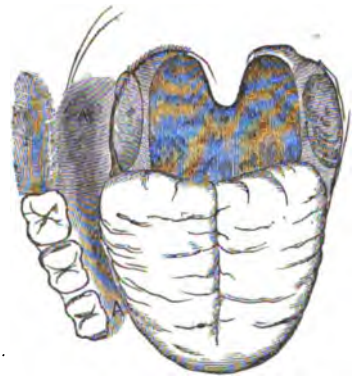


Fig. 5. Diagrammatic view of the soft palate, tongue, and portion of the dental arch designed to illustrate the relation of the soft palate to the floor of the mouth; also to show the position of the præ-coronoid space.

A, A. The upper letter indicates the basal portion of the soft palate anteriorly; the lower one the floor of the mouth.

The latter portion, as already noticed, is distinguished by its whitish color, and has commonly upon its surface a vein whose thickest portion is downward as though it emptied into the lingual veins. The former extends over the pterygo-maxillary ligament downward and forward to the gum tissue about the last molar tooth of the lower jaw. This mucous membrane between the two dental arches may be called the *præ-coronoid space*, and is remarkable for the changes occurring in its relations during the acts of elevation and depression of the lower jaw. When the jaw is elevated the space is much shortened; it is flexed acutely upon

itself; the portion terminating about the wisdom tooth is brought up to the level with the body of the soft palate; and the posterior end of the ridge upon the mucous membrane of the cheek tends to plug up the space from without. As the jaw is depressed, the fold disappears. This mobility is associated with a layer of loose connective tissue between the mucous membrane and the basal portion of the coronoid process which it covers. The relation between the mucous layer and the bone is somewhat analogous to that seen between the pharynx and the vertebral column.

The præ-coronoid space has certain clinical bearings of interest. Observant dentists have long been aware that an incautious application of arsenical paste to an exposed pulp of the terminal lower molar is productive oftentimes of an early and general diffused inflammation of the soft palate. This has been known to extend from the buccal around to the lingual aspect of the tooth by its cingulum of gum, thence, when the jaw is closed, to find easy access by general relaxation of the part directly to the soft palate. An experienced operator has informed me that while engaged, on one occasion, in preparing the lower wisdom tooth prior to filling, his instrument slipped and caused a slight punctured wound of the mucous membrane of the præ-coronoid space. This apparently insignificant lesion caused in the course of a few hours a general tonsillitis and staphyllitis, which terminated in suppuration. Before the abscess opened, which it did spontaneously, dyspnœa with profound prostration were announced.

On the other hand this space may be involved directly from the palate. (See Fig. 9.) The point where the buccal ridge of mucous membrane adjoins the space is not infrequently the site of mucous patches.

When submucous infiltration of this region occurs, may not its influence upon the internal pterygoid muscle furnish a more satisfactory solution of the origin of direct trismus than we have hitherto had?

Luschka (Schlundkopf des Menschen 1868, Tab. 2) defines this space without describing it. The only allusion I have seen made to it is in Kohn.[1] He briefly indicates it as follows:—

[1] Die Syphilis der Schleimhaut, der Mund, Rachen, Nasen und Kehlkopfhöhle, 1866, p. 380. I am indebted to Dr. R. M. Bertolet for my knowledge of this memoir.

"A broad band of mucous membrane extends across the space between the wisdom tooth and the anterior edge of the coronoid process. It represents a union between the muco-periosteum (gum), and the membrane of the general oral cavity."

(*d.*) *The Palato-pharyngeal Fold.*—This is a more powerful band than the palato-glossal. It is a conspicuous ledge of mucous membrane, extending from the soft palate downwards toward the lateral wall of the pharynx. It arises from the former at about the basal third of the side of the uvula. The two folds can form a true arch only when at rest. It then receives the uvula toward its summit. The sides of the arch approximate more nearly than do those of the palato-glossal folds.

The palato-pharyngeal muscle, the basis of the above fold, is inserted by a fan-like dispersion of its fibres within three different regions; one passes across the median line to decussate with those of the opposite side, others continue downward to be inserted into the thyroid cartilage.

In chronic pharyngitis, more particularly the syphilitic variety, I have been struck with the frequency with which ulceration and cicatrization are seen within the pharynx, about the place of insertion of the above folds. In those not rare conditions of masses of tenacious mucus plugging, the orifice of the Rosenmüllerian fossa, I have sought an explanation for the co-associated irritability of the pharynx, by recalling the fact that every act of deglutition necessarily brought the palate in contact with this plug or on a line favorable to the descent of the mucus therefrom.

The palato-pharyngeal folds, as a rule, are symmetrical, and run very obliquely downwards and backwards. The observer will often find the degree of this obliquity varying, thus determining corresponding varieties in the proportions of the tonsillar spaces and the naso-pharyngeal aperture. The latter may be so much narrowed as to interfere with, if it do not entirely prevent a post-rhinal examination. These departures from the average description of this portion of the pharynx are more frequent than is generally supposed.[1] Submucous infiltration and atonic relaxation are the fertile causes of such deformations, apart from the more rare ones of cicatrization.

Another fact it is necessary to remember before proceeding fur-

[1] See Von Tröltsch, trans. by Dr. St. John Roosa, 1869, p. 304.

ther. It is this: The mucus descending from the nose is prevented from appearing at the upper margin of the oro-pharyngeal aperture by the convex swelling at the upper margin of the base of the uvula, but is guided downward by the palato-pharyngeal ledges to the posterior pharyngeal wall. Should the mucus be tenacious, the moment it reaches the wall of the pharynx a contraction ensues, and the irritating particle is ejected.

These folds are to the naso-pharyngeal space both the boundaries to its gate and its sentinel. As they are sensitive to secretions, so they resist interference with instruments. The passage of the Eustachian catheter by the nose is a signal for the untrained palate to ascend, and the folds to approximate. The merest tyro in rhinoscopy knows how necessary it becomes for him to avoid touching these folds with the mirror. The best trained throat resists interference with them. The space between the folds is thus seen to be often excited by the constant irritation of its parts. Submucous infiltrations may arise from this cause, and be capable of assuming great importance in the study of pharyngeal disease. It is more especially immediately to the inner side of the palato-pharyngeal fold that such infiltrations, as well as ulcerations, are seen. The folds when thus complicated have been mistaken for engorged tonsils, which they may in extreme forms in a general way resemble. The space between these adventitious folds is liable to ulcerations. In a case observed at the Philadelphia Hospital, the inferior margin of this ulceration corresponded to a transverse line drawn midway between the two folds, extending thence a distance of four lines. In some cases they are much more extensive. The following note is descriptive of an example of this kind.

T. P. contracted chancre in the summer of 1868. Indurated glands soon thereafter were announced in the groin. These never suppurated. Six months after the chancre appeared, the throat began to annoy him, compelling him to seek admission into the hospital in the winter of 1869. He was discharged May, 1870, much improved; readmitted September 30. The parts about the oro-pharynx, at the time when the note was written, were in the following condition. Uvula and left palato-pharyngeal fold were destroyed by ulceration. The right palato-pharyngeal fold was lost, excepting its lower third. The tonsil of the left side was destroyed in great part. The entire posterior wall of the pharynx

was covered with a tenacious slough, which probably extended upwards to the base of the skull.

In another case the soft palate was entirely gone; and both arches in great part destroyed. A large ulcer occupied the median space on the posterior wall of the pharynx. The walls of this ulcer were rounded, and fleshy. It extended from the level of the

Fig. 6.

Fig. 6. Anterior view of the soft palate from a case of syphilitic angina.
A, A. Swellings (lateral-pharyngeal folds) to the inner sides of the palato-pharyngeal folds.
B, B. The tonsils.
C. A patch of ulceration upon the posterior wall of the pharynx.

dorsum of the tongue upward above the level of the hard palate, and probably to the base of the skull. The ulcer had the appearance of having perforated the pharynx. The whitened, glistening base was evidently formed from the post-pharyngeal connective tissue. To the right side of the ulcer was a smaller and more recent one, which was covered with the usual grayish deposit.

It is probable that the description of the ulcer of the first of these examples would have answered for the early stage of the other. In observing cases of syphilitic pharyngeal ulceration it is well to remember the two localities in which it may be detected; first and mainly in the lateral pharyngeal fold, and secondly in the posterior pharyngeal surface between the folds.

So far as I know, Kohn (*loc. cit.*) is the only author who mentions these adventitious folds. His language is very general, and leads one to infer that he placed no importance upon the method of insertion of the palato-pharyngeal muscles. He says: "Gummy tumors are seen upon the mucous membrane of the posterior

wall of the pharynx in the middle line as well as at the sides, and from these points extend forwards to the posterior nares." I have seen but one gummy tumor within these folds.

Occasionally an enlarged cervical-pharyngeal lymphatic gland may be detected lying immediately to the lateral aspect of the pharynx.[1]

Four cases of closure of the naso-pharyngeal orifice by fixation of the soft palate against the posterior wall of the pharynx were seen. They presented no features of novelty.[2]

II.—The soft palate seen from the naso-pharynx.

(*a.*) *The Palato-salpingal Fold.*—This must be studied by reflected light. It passes upwards and outwards toward the orifice of the Eustachian tube, beneath which it is lost. In slight degrees of elevation of the palate, the fold becomes corrugated and the outer and lower border of the orifice of the tube is made more convex, and the diameter of the orifice shortened. It is easy to confirm the observations of Lucæ and Schwartze[3] to the effect that the fold contracts in inspiration and relaxes in expiration.

This fold, as well as the palato-pharyngeal, is often the site of infiltrations. I have in two instances been unable to obtain a satisfactory view of the posterior nares, owing to the extreme

[1] In a recent dissection of a negro who died of pneumonia, at a time when the lymphatics of the sub-maxillary and lateral cervical region were engorged, I found the pharyngeal lymphatic glands enormously enlarged. See also Luschka Anat. des Menschen i. 198. In this connection compare Türck upon syphilitic tumors of the pharynx, Wiener All. Med. Zeitung, 1861, Nos. 28, 32, 46, 48.

[2] The following references may prove useful in this connection :—

(1.) Kohn (*loc. cit.*) p. 123. "In consequence of the varieties of the method by which the velum palati fixes itself to the posterior wall of the pharynx, the inferior half of the general oral cavity may be more or less completely cut off from the upper." (2.) W. J. Coulson, London Lancet, 1862, ii. 529. (3.) Wm. Turner Proc. Med. and Chir. Soc., 1859., 121, also Edinburgh Med. Journ., 1860, No. lv., 612. The lesion was observed in cadaver, and carefully dissected. Two woodcuts of the dissection accompany the paper. The author refers to other cases by Rudtorffer, Abhand. über die einfachste und sicherste Operations methode eingesperren Leistem und Schenkelbrüche, Vienna, 1805, vol. i. 192. (4.) Otto. Handbuch d' Path. Anat. Breslau, 1813, 40. (5.) Van der Hœven, Langenbeck's Archiv., 1861, i. part 2, 448, Taf. iv. fig. 4, also Sydenham's Retrospect, 1862.

[3] Archiv. Ohrheilkunde, i. S. 96. (See Von Tröltsch, trans. by St. John Roosa, 1869, 194.)

narrowing of the naso-pharynx at about these folds. This enlargement will determine, oftentimes, the shape of the orifice of the Eustachian tube. Syphilitic angina causes submucous infiltrations here, as well as upon the postero-lateral aspect of the pharynx; thus explaining the frequent association of deafness with this disease.

Gummy tumors are rarely met with in the naso-pharynx. I have seen but one case, that of a young woman who presented a small gumma pendent from the roof of the pharynx, to the left of the median line. The liability of syphilitic ulcerations to be found upon the posterior aspect of the soft palate has been so firmly established, that no mention of this statement further than to confirm it is here necessary.[1] Semeleder[2] has alluded to the occurrence of ulcerations upon the roof of the pharynx as well. Of these I have seen but two examples. (See p. 553.)

III.—The relation existing between the mechanism of the soft palate and its superficial veins.

An inspection of the soft palate in health reveals to the observer a number of minute vessels. These are the veins which convey from the soft palate the blood sent to it by the more deeply seated arteries. The soft palate, when examined in the early stage of staphylitis (as seen, for example, in angina), will exhibit everywhere upon its surface minute radiated points of a bright-red color, which may be fairly interpreted to be the terminal twigs of the palatal arteries, supplying the glandular layer. Both the arteries and veins of the soft palate can be seen, therefore, by the naked eye. The remarks I have to make here, however, are restricted to the veins, since they are larger, more superficial, and can be seen readily in the healthy palate. Moréover, there is more variety in their distribution than in that of the arteries, at the same time (as I have conceived) a degree of order in such variety.

The principal superficial veins of the soft palate are the following:—

1. A group of radiated venules is situated on either side of the raphe of the soft palate at a point about midway between a

[1] See especially in this connection, Dr. Benj. G. Babington, London Med. Gaz., 1829, vol. iii. p. 355.

[2] F. Semeleder. Rhinoscopy and Laryngoscopy, etc., trans. by E. T. Caswell, M.D., 1866, p. 56.

Fig. 7.

Fig. 7. A diagrammatic representation of the soft palate. (Modified from Luschka.)
A. The vessels about raphe, showing the manner of the formation of the radiate figures.
B. The præ-coronoid space.

hypothetical line connecting the prominences of the hamular processes, and the base of the uvula. It would appear as though several superficial veins converged to a point at which the common trunk passed abruptly into the deeper structure of the palate. The branches running parallel with the raphe may occasionally be united; thus making an H-shaped figure.

2. A small vein may cross the raphe at a point a little in front of the preceding, and probably corresponds to the limit of the palatal aponeurosis, since it lies pretty nearly on a line drawn between the prominences of the hamular processes.

3. Another small vein is often seen at a point answering to the band of fibres belonging to the palatal portion of the palato-glossus muscle where it joins its fellow across the median line.[1]

[1] The other veins of the soft palate are:—

1. A pair found upon the uvula, on either side of the now inconspicuous raphe. These are generally tortuous, sometimes varicose, and may be asymmetrical.

2. The lateral palatal veins. These are, as a rule, quite large. They arise from among the sub-mucous tissue about the central portion of each lateral half of the palate (assuming a sub-dendriform shape) and pass directly outwards to abruptly terminate near the upper margin of the tonsillar space.

3. Sometimes numbers of venules occupy the aponeurotic portion of the palate, across the raphe of which their branches may freely extend. These vessels should not be confounded with the main transverse vein, which lies of course posterior to them.

4. A small tortuous vein is occasionally seen running along the position of the palato-glossal muscle to join the vessels at the side of the raphe.

5. Very rarely a vein extends across the raphe where the soft palate joins the roof of the mouth.

When the muscular portion of the soft palate is elevated, as in deep inspiration, it becomes slightly convex upwards, and the anterior border of the dome shaped expansion is seen to answer almost exactly to the *second* rapheal vein. When the palato-pharyngeal muscles approximate, they are seen to converge and effect a junction toward the close of the act of elevation. The lateral contraction now begins; namely, at a point corresponding to the *first* vein. So, if the positions of the veins are given, the soft palate being at rest, its lines of flexion may be determined. The variation from the above arrangement is perhaps no greater than those met with in the distribution of minute terminal vessels in other portions of the body. The stellate figure made up of an incipient longitudinal vein, joining an internal transverse vein, which may or may not cross the raphe, and an external transverse vein, generally larger than the preceding, are among the most constant features of the anterior surface of the soft palate.

Recognition of the arrangement of the bloodvessels is useful in determining the site of engorgements and ulcerations of the glands of the soft palate. As is well known, the glandular layer of the velum is very thick. The orifices of the glands open upon the anterior surface, and pour out a glairy secretion. When the parts are examined under a strong light, the palate will, after a moment or so of exposure, be studded with minute drops of this secretion. Such outflow is generally symmetrical, although I have at times observed the contrary. The relation between a unilateral excess or diminution of secretion, while hinting to restriction of a morbid process, is not sufficiently uniform to be of any value at this time.

The follicles of the hard palate pass into those of the soft, without any distinguishing features beyond the fact that the orifices of the former group are more apparent than the latter, and can, particularly in the aged, be seen as minute blackish points, similar to those of the cæcum.

Over the aponeurotic portion of the soft palate and the terminal portion of the hard, the follicles are at times arranged thus:—

A longitudinal row corresponds to the side of the raphe and passes upward to the position of the palatal spine, where, about the two minute depressions marking this locality, the glands are

seen to describe lateral branches presenting a series of curves, convex anteriorly.

This twig-like figure is not at all times arranged symmetrically to the palate, but may be slightly deflexed either to the right or the left. I have seen the glands at about the palatal *pits* (such an

Fig. 8.

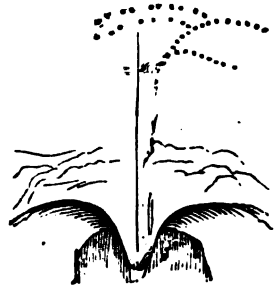


Fig 8. Showing the palatal "pits" with a curious disposition of the follicles of the hard palate. From an inmate of the Philadelphia Hospital.

expression may be improvised) ulcerated in a case of tertiary facial tubercle. No oral lesion was suspected by the patient.

As a rule, however, follicular engorgement of the hard palate is not often seen in the tertiary form of syphilis. The follicles arranged along the side of the raphe of the soft palate are more apt to be attacked. The following case is used as an example of the insidiousness with which the encroachment of a late form of specific angina may take place.

Mary R., aged 18; contracted the disease at 12 years of age. She had virulent bubo, and a slight papular syphilide. She came under notice Feb. 24th, 1872, with a tertiary ulcer over right leg. No other apparent complications at this time appeared. She denied ever having had sore-throat, falling of the hair, or iritis. The throat, when examined, gave no indications of trouble beyond a slight fulness about the palato-pharyngeal folds. An examination of the naso-pharynx being instituted revealed extensive infiltration of the palato-salpingal folds, and the membrane covering the vomer and both inferior turbinated bones. This latter feature was very marked. The patient refused to submit to treatment, declaring that her throat "was not sore." She was warned of the danger she was incurring, but she persisted in her refusal, and was

discharged at her own request March 7th, 1872. When readmitted March 29th, the ulcer upon the leg was worse, and symptoms referable to the nose had now declared themselves. The vomer and the roof of the naso-pharynx were found covered with ulcers. The palato-salpingal folds remained swollen. There was some tumefaction and soreness on pressure at the root of the nose externally. The right choana was almost entirely closed.

The following was the appearance of the anterior surface of the soft palate: The median portion of the posterior third of hard palate was marked with follicular ulceration: and an isolated follicle was seen upon the left half of the soft palate near the palatal bone. Another was seen at the base of the uvula upon the right side. The first stellate vein was scarcely conspicuous. The transverse vein was entirely absent. The raphe of the soft palate was clearly defined down to the uvula. The *pits* were unusually well marked,—tonsils not enlarged. There was no pain in deglutition. Patient complained of dryness of the throat.

In the case of another female having a rather late manifestation of angina, viz., eight months after incubation, the raphe was found well defined, and had a row of enlarged follicles upon either side, ranging from the palatal aponeurosis to the base of the uvula.

As a rule such follicular engorgement or ulceration is not so distributed, but is first noticed at or about the position of the transverse veins. In the person of a young man,[1] a messenger in the Philadelphia Hospital, the subject of secondary syphilis, a serious expression of angina was announced by engorgement of the *vallecul*æ of the tongue with coincident diffused staphylitis. An enlarged and inflamed follicle was noticed at the time of the first examination at the second vein of the left side. The case when next seen after an interval of a fortnight, during which no treatment had been instituted, exhibited an extension of a diphtheroid inflammation from this focus downward, toward the free margin of the palate. Thence it extended across the median line, involving

[1] W. W., aged 22, contracted syphilis, November, 1871, character of sore unknown. Had phimosis. There is a history of a copious papular eruption having appeared about the sixth week after incubation. In March, 1872, the throat lesion as above described was announced. In addition to the account as given, it is interesting to remark the unusual degree of tolerance present in the mouth. The tongue could be depressed, so as to expose the side of the pharynx from the tonsil to the epiglottis, permitting a view of the infra-tonsillar glands (see fig. 12) to be secured.

the right side of the palate, to encroach upon the præ-coronoid space, thence to occupy the gum surrounding three of the sides of the right wisdom tooth.

Fig. 9.

Fig. 9. Ulceration of the soft palate involving the præ-coronoid space, and thence the gum tissue about the right wisdom tooth of the lower jaw.
A. The ulceration upon the soft palate.
B, B. The limits of the ulcerated tract inferiorly.

In another instance, coming under my notice in private practice, a bar-tender, a man of intemperate habits, suffering from syphilitic engorgement of the basal dorso-lingual papillæ, was attacked with diphtheroid (apthous) inflammation of the soft palate. The patches upon the soft palate exactly corresponded to the lines determining the continuation of the palato-glossal fold forward toward the median line, and to the distribution of the lateral vessels of the raphe.

A third example occurring in a woman suffering from secondary syphilis is interesting from the fact that it was associated with necrosis of the incisorial portion of the superior maxilla.

An extensive ulceration upon the soft palate was distributed as follows:—

The entire rapheal region was occupied. A transverse branch of ulceration extended from middle portion outward on either side. Both palato-glossal spaces was nearly occupied. (Fig. 10.)

In a fourth case observed in a patient at the Philadelphia Hospital suffering from osteocopia, the following condition was noticed in the pharynx and soft palate. (Fig. 11.) The right palato-pharyngeal fold was destroyed, excepting a small portion toward the base of the uvula. The tonsil of corresponding side was also destroyed. Upon the left side the palato-pharyngeal fold was partially destroyed. Its inferior extremity was lost in the large post-apertural fold, which

latter had been dragged toward the median line of the posterior wall of the pharynx, where a large glistening scar was seen. The

Fig. 10.

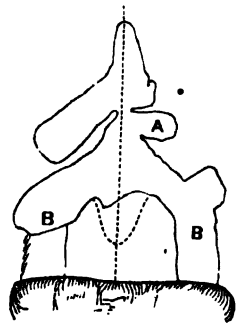


Fig. 10. An outline sketch giving the shape of ulcerated tract; the shape of the ulcer being determined, it is thought, by structural conditions.
A. An extension of the tract at the position of the constantly seen vessel.
B, B. The palato-glossal fold.

uvula was not impaired. The soft palate was marked by a cicatrix, having a peculiar shape. The raphe was ulcerated from the

Fig. 11.

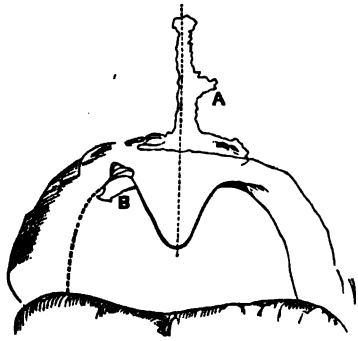


Fig. 11. An illustration of the same principle as fig. 10.
A. The process corresponding to the position of the vessel.
B. The remains of right palato-glossal fold.

posterior edge of hard palate down to the base of the uvula. The first stellate vein was the site of a transverse extension to the left side, while the lower end of the linear scar was joined by a transverse one, extending along the curve of the palato-glossal fold nearly the entire breadth of the base of the uvula.

The inferences to be drawn from these cases are: (1) That, in

some cases of syphilitic angina, a connection exists between the distribution of ulcerative action and the normal arrangement of bloodvessels, as well as between such ulceration and the mechanism of the soft palate. The liability of the vein of the left side of the raphe to be selected as the site of the follicular engorgement and ulceration is worthy of notice. (2) That venous stasis is the predisposing cause of such ulceration. The exciting causes may be accredited to the constant fretting of the follicles situated about the radiate venules; since it is observed that, in the associated acts of the elevation of the palate with the lateral closure of the pharynx, the ulcers are apt to occur at the point where there is the severest strain.

IV. Remarks upon the naming of the parts associated with the soft palate.

These parts having received much attention at the hands of anatomists, it would appear superfluous to dwell upon the mere nomenclature of a region so familiar. Luschka's[1] magnificent monograph on the pharynx is exhaustive upon technical points, while the earlier yet elaborate writings of Dzondi,[2] Tourtual,[3] and Merkel[4] render our knowledge of this region as complete as that of any other portion of the body. Were it not that in English works the language employed is less exact than is desirable, and that even among the best foreign authors a lack of uniformity prevails in their descriptions, I would not presume to offer any suggestions here. Without giving a wearisome *résumé* of the opinions of others, I may be allowed to postulate that the best name possible for a given viscus or marking is that which best expresses its nature. Where this is not practicable, the next best is that which is true of the part at all times, or at least is that which at no time conveys a sense of error. In this light the "*tensor-palati* muscle" is a bad name for the *spheno-salpingo-staphylinus* muscle, since it is doubtful that it exercises any influence over the tension of the palate. The term "arch," as applied to the accessories of the soft palate, is also unfortunate. The so-called anterior arch is in reality

[1] Der Schlundkopf des Menschen von Hubert v. Luschka, Tübingen, 1868.

[2] Die Functionen des Weichen Gaumens, etc. K. H. Dzondi, Halle, 1831.

[3] Neue Untersuchungen über den Bau des Menschlichen Schlund und Kehlkopfe, etc. Dr. Caspar Theobald Tourtual, Leipzig, 1846.

[4] Anat. und Physiol. der Stimin. u. Sprachorgane. C. L. Merkel, Leipzig, 1857.

not an arch at all, excepting under conditions suggesting a want of tonicity in the posterior tractors of the palate, viz., when the two palato-glossal muscles have the upper thirds of the axis of their fibres brought in relief from the soft palate (*supra*, p. 541). In the same way the term "posterior arch" is inadequate, since the form of the arch is complete only during the inactivity of the parts concerned. That name is best which is true of a part in activity. One is sensible of an inadequateness in speaking of an arch, when at the time it may be but a narrow chink with vertical walls, or a triangle, whose apex is in advance of the archal figure. It is simpler, and therefore better, to describe these "arches" as *folds;* the palato-glossal for the anterior, and the palato-pharyngeal for the posterior folds. These folds, defining as they do diameters of the alimentary canal within the head, may be known as the limitations of *orifices*. Thus Luschka elaborates an *oro-pharyngeal orifice, i. e.*, the space between the palato-glossal folds laterally and the uvula superiorly. The *naso-pharyngeal orifice* is that space between the palato-pharyngeal folds and the uvula superiorly. The division of the pharynx below the soft palate is the *oro-pharynx*, as that above that structure is the *naso-pharynx*. It would thus appear that an exact terminology would demand for the orifice between the oral and the nasal divisions, the name of the *oro-naso-pharyngeal orifice*. But this is long and cumbersome, and suggests the expediency of adopting the name as Luschka accepts it, notwithstanding that the true naso-pharyngeal orifice, so well described as the posterior nares, is the aperture of communication between either nasal cavity and the supra-palatal divisions of the pharynx. The space between the *folds* may be denominated the *tonsillar space*. No name of exactitude has been given this locality, excepting the *Interstitium arcuatum* of Continental authors.

For reasons already given, the term arch (arc, arcus) even when dissected into "half arch"—is objectionable. The space as above denominated extends downwards, along the side of the pharynx, to the side of the root of the tongue, and is as a rule occupied its entire length by tonsillar glands. These may be conveniently divided into the *tonsillar* (for convenience "tonsil"), and the *infra-tonsillar glands* (Fig. 12). (*Cryptæ-vestibuli inferiores* Tourtual.) The *fovea ovalis* is a non-glandular depression, described by Tourtual, existing between the tonsil, the glands just named, and the naso-pharyngeal orifice. It is convenient to describe the parts of the tonsillar space, with reference to the *fovea ovalis*, the degree it

may be encroached upon, obliterated, or how enlarged. The diameter of the oro-pharynx between the tonsils may be denominated the *inter-tonsillar* space.

Fig. 12.

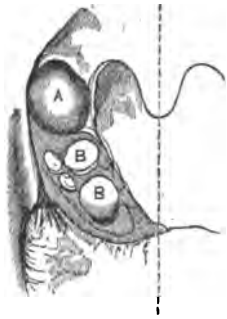


Fig. 12. A diagrammatic view of the right tonsillar space.
A. The tonsil.
B, B. The infra-tonsillar glands.

The term fauces, although having the odor of antiquity about it, is best avoided. There is, perhaps, more uncertainty attending its use than any other term in the region of the soft palate. Leidy describes it as a straight *passage* leading from the mouth to the pharynx; that is to say, it is in this sense synonymous with the inter-tonsillar space. Cleland, in Quain's Anatomy, 1872, in one portion of the work (p. 799) denominates the "fauces" as an *opening* from the mouth into the pharynx, while in another (p. 199) he defines the anterior and posterior folds as the *pillars* of the fauces, thus virtually acknowledging the area *between* the two folds as the fauces. The use of the term *constrictor isthmii faucium*, as a synonym of the palato-glossus muscles, indicates that the oro-pharyngeal orifice were such an isthmus, and, therefore, the connecting part between the mouth and pharynx. Now, as an aperture, the term naso-pharyngeal orifice is preferable to "fauces;" and, as applied to a passage, the latter term is, to say the least of it, superfluous, for no passage exists.

The mouth and pharynx communicate by the oro-pharyngeal aperture. The tonsil is clearly within the pharynx.[1] It is

[1] In proof of the nature of this fact, see a case of congenital deficiency reported by Wolters (Zeit. f. Rat. Med., 1859, p. 156, pl. iv.). The position of the palato-glossal fold is occupied by a band of membrane, leaving the tonsil in position. The palato-pharyngeal fold and the wall of the pharynx are freely exposed.

embraced by the superior constrictor muscle, and in the act of gagging may be drawn well back toward the vertebral column.[1]

[1] Tourtual (loc. cit. p. 75), asserts that "the isthmus faucium is not the entrance into the true pharynx from the oral cavity. I would consider," continues this writer, "the *isthmus faucium posterior* (die hintere Rachenenge,) as such entrance as opposed to the *isthmus faucium anterior* (vorderen Rachenenge). The triangular space between them is the *vestibulum pharyngis medium* (mittlere Vorhof des Schlundes)." It is a little curious that after this attempt to include the tonsillar space within the mouth he should have treated the subject under the caption of the Oral Division of the Pharynx.

THE PRINCIPLES

INVOLVED IN THE

TREATMENT OF FRACTURES OF THE EXTREMITIES WITH THE STARCH BANDAGE.

ILLUSTRATED BY A NEW MODIFICATION OF THAT DRESSING.

BY

CHARLES N. HEWITT, M.D.,

MINNESOTA.

THE PRINCIPLES INVOLVED IN THE TREATMENT OF FRACTURES OF THE EXTREMITIES WITH THE STARCH BANDAGE.

THE adoption of the starch bandage as a fracture dressing, by the profession at large, is very much hindered by the fear, that, as an *immovable, unyielding* apparatus, it is liable to many and serious objections, which do not lie against a looser and more easily changed dressing (*e. g.* ordinary side splints retained by a single or many-tailed bandage, or the later method by simple extension and counter-extension), though the majority readily admit the older modes to be as unsatisfactory as imperfect.

In common with every one who has had much experience in the use of the starch bandage (and under this name, as the principle is the same, I include all its forms whether the stiffening material be starch, parafine, glue, plaster of Paris, etc.), I have been made aware, by my own fears and by the caution of others, of its possible and probable dangers and disadvantages, and have had a fair opportunity to test them both.

As the result of fifteen years' experiment, four of which were in the army, I have so modified its construction and adapted it to a varied use, that it now proves satisfactory to myself and a very great comfort to the patient. I am prompted, by all I see and read of the use of this bandage by others, to submit my modification to the consideration and trial of those who have greater opportunities than myself, to test its value.

As the successful use of any dressing for fractures depends upon a clear understanding of the principles involved, a brief review of them and of the anatomical facts upon which they are based will serve to make my meaning clear.

1st. The bones of the upper extremity lie *nearest* to the *posterior surface* of the limb, and the exact *reverse* is true of the *lower* limb.

2d. The curvature of the *shafts* of the bones is in the same di-

rection, *backwards* in the *arm* and *forearm: forward* in the *thigh* and leg.

3d. The most powerful muscles, the flexors, thick and fleshy, act in the direction of *chords* to the *curvature* of the bones, and in contracting their bellies are (to a greater or less degree) *separated* from the surface of the bones, while the opposing muscles, the extensors, are *less fleshy, more tendinous*, and lie *closely* to the bone while in action.

4th. The chief *deep* and *superficial bloodvessels* and important nerves, as a rule, lie under or at the inner border of the flexors and *inside* the *curvature* of the bones, being thus protected from undue pressure whether the muscles are at rest or in action.

From these and other anatomical peculiarities which will readily suggest themselves, it follows as a rule, that the displacement in fractures is in the direction of the curvature of the bones *i. e., outward* and *backwards* in the *arm* and *forearm*, and *forwards* and outwards in the *thigh* and *leg*, modified of course by the character and direction of the fracture.

The first principle of treatment is that the splint, the smooth, soft, and inflexible surface against which the bandage holds the broken bone, should always be *nearest* the bone, and be as closely *moulded* to it as possible *on the outside of its curve*, separated from it only by the skin fascia, and solid semi-tendinous extensor muscle, which serves the purpose of a *snug* and *fixed* cushion. The soft, fleshy flexor muscles which inclose the bloodvessels and nerves, should not be compressed by any *hard* substance at all, but by a soft and yielding bandage. The next principle of practice is that in fracture of the *arm* and *thigh* the injured limb should, as a rule, be dressed in the semi-flexed position, *the normal position for rest*, and that the bandage should include the *entire* extremity, because, first, in that way the adverse action of the powerful flexors is less likely to be excited, and they are more readily used as cushions, retaining the fractured bone against the splint in a pressure sufficient to *restrain* their action without injuriously compressing the bloodvessels and nerves, and second, that by the bandage, motion of elbow or knee is prevented, and œdema of the limb avoided. I am satisfied from experience that *severe* or *long continued* extension and counter-extension, are very rarely, if at all, necessary in the treatment of fractures. A fractured femur, for instance, if *properly placed* in a double-inclined plane will be found of the normal length, and can

generally be easily retained so by a properly applied starch bandage.

There is no *test* so sure and true of proper dressing in fractures as *absence of pain.* When all is right, pain is hardly complained of or felt. If it is severe and persistent, we may be certa n that something about the dressing is wrong, which (except in cases of very severe injury to adjoining textures), a little attention will remove. The value of pain as an indication for care is such that I very rarely blunt it by opiates; I am sure I have seen damage in this way from their use. A much better way is, when it is present and accompanied, as it often is, by contraction of the muscles and overlapping of the broken bone, to seek and remove the cause by a change of position or bandage. That done, *stretching* will rarely be necessary.

The splint should *clasp the lower extremity* of the fractured bone, the condyles of the humerus or femur, the styloid process of the ulna, or the malleoli at the ankle. A fixed support above the fracture is not possible in the case of femur or humerus, but can be made of the bones in forearm and leg. It is only necessary in either case to prevent a *rotary* motion of the bones on their axes. It can be easily done in the leg and arm. Adjust the dressing carefully to the ends of the bones, and when dry, displacement is impossible. In the case of the thigh, leg, and forearm, the limb has the form of a truncated cone the base upward, a *close fitting starch bandage* is prevented from working up and prevents shortening of the limb. Any dressing to fill the indications must provide for the rapid *reduction* of *swelling* when it exists at the first dressing, and for the atrophy which speedily occurs in enforced quiet of the muscles. Confinement to the bed, and generally to the recumbent posture, for weeks, as is the ordinary rule in fractures of the femur and often of the leg, is not only irksome to the patient, but injurious to the general health, by so much, preventing or retarding the cure.

To sum up the indications as to a dressing for these fractures, it may be said that what is wanted is, 1st. One which can be applied *once for all:* made of materials readily obtainable in every house, and requiring the least skill in their use for its construction. 2d. One which, *without removal,* can be made to accommodate itself to the varying size of the limb—not easily displaced, and within the control of the nurse or even of the patient himself—after proper adjustment and simple directions by the surgeon. 3d. One which

confines the patient as little as possible to the bed or the house. All this, and more, the starch bandage, properly made, does.

It can be made of the greatest variety of materials. It can be applied *with advantage immediately* to a limb *swollen* and *tender*, as to one not swollen at all. I have applied it to a broken arm greatly enlarged by erysipelas, and to a leg larger than the thigh from acute œdema, with equal advantage, not removing it in either case till the cure was nearly complete, and then only for purposes of cleanliness.

The benefit in such cases is due, first, to the graduated pressure on and support of the limb, and next, to the fact that the drying starch is a very efficient evaporating lotion. By artificial heat and free ventilation, it can readily be made to induce a painful degree of cold. I once applied it for oblique fracture of lower third of the leg for a soldier; dried it by artificial heat, and four hours after he sat with the driver of an ambulance, and rode nineteen miles in a cold day, over a Virginia corduroy road to camp, with but little pain. I found him the next day eating his dinner, sitting on a stool, *both feet* on the ground. When properly applied, in fracture of the thigh below the upper third, I have permitted the patient to sit up in a chair any time after the *third* day, and go on crutches (the limb supported by a sling) after a week. In fractures of the leg, the bandage extending only to the knee, no confinement is necessary *after the dressing is dry*. I can but illustrate the modifications proposed, by examples.

Mrs. W., æt. 70 years, an invalid, slender and delicate woman, for many years the victim of chronic articular rheumatism, with enlargement of the joints. One evening slipping from a stoop, she fell, producing oblique fracture of the tibia between the middle and lower third, and of the fibula a little higher up. I saw her soon after the accident, and found the upper fragment of the tibia pressing on and nearly through the skin. The posterior fragment was imbedded in the muscles of the calf. There was some swelling from effusion of blood. Ordered a pint of thick flour paste made, and an old sheet torn and rolled into bandages three fingers wide. While talking with her as to the mode of the accident, the limb was easily, and with little pain, placed in correct position on a pillow. With a few strips of board, hammer, saw, and nails, a double inclined plane, with a foot-board, was easily and quickly made. This plane was wound thickly with cotton batting retained by a bandage. Upon the lower arm of this plane were placed,

from above downwards, two layers of many tailed bandage, and upon them a layer of cotton wadding, split so that the glazed surface was downwards. So arranged, the dressing is ready for use. Placing the limb gently upon it, more wadding is used, if need be; adapt the one to the outline of the other. The batting on the plane should be at least an inch thick *under the tendo Achillis*, and there *should be none under the heel.* The limb so placed, the next step is to attach to each side of the foot a strip of adhesive plaster, or, in lack of that, pieces of starched cloth which, when the dressing is complete, can be attached to the foot-board, and have the double purpose of maintaining the foot perpendicular and steady, and *preventing pressure* on the heel. The layer of split wadding is now wrapped smoothly around the foot and leg, and over that the first layer of bandage is neatly and snugly applied, *beginning at the foot. The starch is applied with the hand to the overlapping ends only*, as each strip of bandage is used; one layer on, the other covers it in the same way (I generally put between them, two or three folds of starched cloths *lengthwise* the leg to secure greater firmness). The foot is now supported by the adhesive plasters from the foot-board, and the dressing is complete. The foot should be so supported by this arrangement, that its *inner* border be on a line with the inside of the knee, and that the outline of the tibia be as projecting as possible. For that reason it is better done after the leg is in position, and before applying the bandage.

The limb is kept steady *till the bandage is dry*, by a *temporary* bandage around the thigh and the upper arm of the plane. Under ordinary circumstances, the starch is dry in thirty-six or forty-eight hours. The drying may be hastened or delayed by facilitating or impeding evaporation. Once dry, the starch bandage is a *snug* and *perfect* envelope of the limb, *perfectly moulded* to every outline. For fractures of the leg or forearm it extends from the toes or fingers to the knee or elbow joints, the *motions of which are unimpeded*, and its anterior surface on the leg (posterior in the forearm) is hard and unyielding, while the *posterior* surface on the leg and *anterior* on the forearm is as soft and flexible as the cloth of which it is made. This is the peculiarity of construction to which I wish to call attention. That half of the bandage which lies over the extensor muscles and the *arch of the bones is solid and unyielding*, while that half which incloses the *flexor muscles, vessels*, and *nerves* is *unstarched* cloth, *fitting the limb*, and not easily displaced. A just objection to the ordinary form of starch bandage is in this

way obviated, and perfect *ventilation* of the limb secured. I propose the use of the double inclined plane *only* as a *convenient rest* for the inner limb till the *starch* of the dressing is *dry*. It secures better flexion of the limb and perfect quiet, and by raising the foot of the plane, any required degree of elevation can be given to the whole limb by flexion of the *hip joint alone*. This I have found of advantage in case of great swelling, materially arresting the graduated pressure of the bandage, and the evaporation of the water of the starch in its removal. It permits also other changes of position, thus adding greatly to the comfort of the patient. After the starch is dry, I permit the feelings of the patient to decide as to its further use, *except* in fractures of the *upper third* of the femur, where it should be retained for about two weeks. Mrs. W. made a good recovery; was able to sit on a chair after the first week, and was on crutches after the third week.

John Johnson, Swede, æt. twenty-six years. While chopping cord wood on the side of a bluff, felled a tree in such a way that his ankle and lower third of leg were crushed between it and a stone. He was alone, and worked his way down the bluff a half mile; then by the aid of another man he walked, or rather hopped, on *one* leg more than a mile, was put into a timber sleigh, and rode two miles further over a rough road to his home. I saw him about six hours after the accident and found the limb swollen to the capacity of the skin. There was a very severe contusion over the inner malleolus, and much discoloration of the skin of the leg from effusion of blood, with an occasional large watery blister, as appears in erysipelas. Motion of the fragments of bone on each other was impossible, even of the ankle, so great was the swelling. By measurement, the calf was much larger than the thigh. I could only infer fracture from the history of the case and the evidence of injury. The starch bandage, as described, was snugly applied to the limb on the double inclined plane, the lower extremity of which was well elevated. The rapid evaporation of the starch was promoted, and in three days the splint was so loose that it had to be tightened, which *the attendant* did, as he was instructed, by passing from *heel* to *knee around* the leg *over* the dressing broad strips of bandage, and *tying* them in *hard knots over the anterior hard surface of the dressing*. I saw him in a week, slit up the unstarched bandage where necessary to get at the contusion and blisters, dressed them, and reapplied strips of cloth as at first, with starch. I saw him but three times at his home.

All the adjustment necessary was done by the attendant. Thirty-eight days after the injury, he rode eight miles over a rough road in a huckster wagon to my office. I removed the bandage by *cutting* it open in the *unstarched* portion; found all right, and reapplied it, retaining by a single long bandage, which the patient removes daily, and reapplies after a bath.

Fracture of Femur.—Ole N., æt. twenty-four. Thrown from a wagon, two miles from town, producing oblique fracture of the femur at junction of middle and lower thirds. He was picked up and brought back on a load of hay. I found him in bed an hour or more after the injury; the thigh bent at nearly a right angle outward. He was in great pain, and unwilling to have the limb touched. Distracting his attention by a little banter as to his poor oxmanship (a pair of steers ran away with him) he became quite excited in his own defence, and, almost without his knowledge, and without his consent, the limb was easily straightened and placed in the inclined plane prepared as already described, the entire splint covered with wadding and the many tailed bandages, extending from the toes to the groins. The *anterior surface* was starched, and inclosed the *condyles* and *trochanters* of the femur, resting against the pubis on the inner side. He sat on a chair on the fourth day, was on crutches on the eighth day (the limb supported by a sling). In the fifth week, he rode home twenty miles, and reported himself in the eighth week as ploughing, with a limb as straight and as long as its fellow, but not quite so strong.

A case of compound fracture just above the knee-joint was treated in the same way, and with equal success. The cases related are taken as fair illustrations of the method and success of the modification of the starch bandage used. I leave them, and the grouping of anatomical facts and principles of treatment stated in this paper, to speak for themselves, only asking a fair trial for the method proposed, before a judgment as to its merits.

RED WING, MINNESOTA, May 2, 1872.

REPORT

ON

AMERICAN MEDICAL NECROLOGY.

BY

J. D. JACKSON, M.D.,

OF KENTUCKY.

REPORT ON AMERICAN MEDICAL NECROLOGY.

THE Chairman of the Committee on American Medical Necrology, in presenting the accompanying report, deems it proper in view of its very defective character, to say that since the labor of its preparation must be a conjoined one, the aggregation of the labors of his confreres appointed for the different States, the failure to hear anything whatever from several of his coadjutors, must explain the hiatus perceptible in many parts of the report. This is too frequently incidental to the formation of a new committee, and it is to be hoped that it may be remedied in the future.

Committee on American Medical Necrology.—Drs. J. D. JACKSON, of Kentucky, Chairman; CHARLES W. PARSONS, of Rhode Island; E. A. HILDRETH, of West Virginia; WILLIAM LEE, of District of Columbia; T. M. LOGAN, of California; W. C. WARRINER, of Oregon; H. D. HOLTON, of Vermont; W. J. SCOTT, of Ohio; W. D. BUCK, of New Hampshire; A. SAGER, of Michigan; V. KERSEY, of Indiana; A. E. AMES, of Minnesota; H. K. STEELE, of Colorado; D. MASON, of Wisconsin; S. D. GROSS, of Pennsylvania; D. W. STORMONT, of Kansas; J. B. JOHNSON, of Missouri; H. R. STORER, of Massachusetts; W. S. W. RUSCHENBERGER, U. S. N.; J. W. H. BAKER, of Iowa; J. O. HAMILTON, of Illinois; J. H. PEABODY, of Nebraska; L. P. BUSH, of Delaware; G. W. RUSSELL, of Connecticut; SAMUEL C. CHEW, of Maryland.

ALABAMA.

The subject of this sketch, Dr. T. R. HILL, was the son of Dr. Hill, of Hawkins County, East Tennessee (a physician and surgeon of high character and of large reputation in his day), and was born in that county in 1818, and died in Montgomery, Alabama, on the 27th of November, 1871.

He commenced practice in Trenton, West Tennessee, and was made U. S. Surgeon at the beginning of the Mexican War, which position he faithfully and honorably filled until the close of that war, after which he settled at Memphis, Tennessee, and practised his profession successfully, and in connection with the administration of the hospital at that place for several years. He left Memphis and settled in Montgomery, Alabama, in 1852, where he prosecuted his professional duties faithfully, successfully, and honorably, keeping his professional and individual character without shame or reproach. He was physician and surgeon to the Montgomery City Hospital for twelve years, the duties of which he performed to the entire satisfaction of the city authorities. He was elected to the second term of the Presidency of Montgomery Medical and Surgical Society, succeeding in that office Dr. Wm. O. Baldwin, who was our first President after the late war. Such is a faithful but brief sketch of one of the highest toned and morally honest gentlemen I ever knew, and of one who came as near filling the measure of a true physician "as in him lay." Peace to his ashes, and all honor to our unassuming, unobtrusive, but most worthy brother.

CALIFORNIA.

De Witt Clinton Rice was born in Clarksville, Oswego County, New York, on May 25, 1823. He graduated at Albany Medical College in 1848. He sailed for California in 1849, and located at Marysville, Yuba County. In 1864 he removed to San Francisco, where he remained until the time of his death, which occurred August 3, 1870.

Dr. Thos. M. Logan, of California, says, "To his energy in a great measure is due the building to Marysville of the California Pacific Railroad, of which company he acted as President until a few months previous to his death, when ill health compelled him to resign. Now that he is gone, thousands of Californians who have known him will remember him for his pure and amiable character and his useful deeds, and will sympathize with his bereaved family."

Isaac Rowell was born in Coos County, New Hampshire, in 1818. He was educated at Dartmouth College, and after obtaining the degree of M.D. began the practice of medicine in Gardiner,

Maine. In 1849 he went to California, and, arriving in San Francisco on June 16, engaged at once in the practice of his profession, and remained there until the time of his death.

He took an active part in the organization of the Medical Department of the University of the Pacific in 1855, and was elected to the chair of Chemistry. In 1868 he was made Health Officer, and served in that capacity during the epidemic of smallpox in 1868. In 1870, upon the reorganization of the University of the Pacific, he was elected to a chair of Special Surgery, which position he occupied until the time of his death, which took place on January 4, 1871.

Dr. T. M. Logan, of California, says, "From his earliest boyhood the life of Dr. Rowell was one of untiring activity. His reputation as a physician and surgeon, and his philanthropic and social qualities, were equally well known throughout the entire Pacific coast. The obsequies, which were conducted by the Masonic order, were among the most imposing ever witnessed in California."

DELAWARE.

JOHN MERRITT, a much-esteemed citizen of New Castle, Delaware, died of apoplexy January 5, 1872. He was suddenly seized in his office at about 5 o'clock P.M., and survived until 8.15. P.M.

Dr. Merritt was born in St. Georges Hundred, New Castle County, Delaware, in 1816, being of a numerous and highly respectable family in that neighborhood.

He studied medicine, and graduated in 1841, and practised his profession for many years with success. In 1856 he was chosen elector for President from this State on the Democratic ticket, and President Buchanan, in 1857, appointed him Consul to Tunis, where he remained about two years. In 1860, Governor Benton, of Delaware, appointed him Clerk of the Peace for New Castle County, and, upon the close of the term for which he was appointed, Governor Saulsbury re-appointed him, his second term expiring in 1870. Dr. Merritt enjoyed in a high degree the respect of his community.

DISTRICT OF COLUMBIA.

B. JOHNSON HELLEN was born in Washington City, D.C., March 20, 1830, and died July 2, 1864. He commenced the study of medicine in 1848. A short time after receiving his degree of

doctor of medicine, he was elected resident physician and surgeon of the Washington Infirmary, which position he held for a number of years. In the discharge of his duties in this institution, he displayed so much interest in his profession and such skill in the diagnosis and treatment of disease, that nearly all the cases admitted were entrusted solely to his care. In due course of time he left this institution, and, after its destruction by fire, his philanthropic nature leading him to look for some new field of duty besides that to be found in private practice, upon the solicitation of the Sisters of Charity, who were about founding a hospital in Washington, he accepted the position of physician and surgeon of what is now known as Providence Hospital, one of the largest and finest institutions of that character in the District.

Dr. Hellen was naturally of a delicate constitution, and his habits of study and rigid attention to his practice soon affected his health, and tuberculous disease of the lungs made its appearance and in a short time terminated his life. His energy and determination of character were remarkable for one with so feeble a physical frame, as the writer has often known him to leave his sick bed, contrary to the advice of his physicians, and go to the hospital to prescribe for those under his care, and even use the knife in many important operations. His love for hospital practice was such that he would refuse to see other patients, fearing that his strength would be so exhausted as to prevent him from making his daily rounds at the hospital. He was a member of the Medical Society of the District of Columbia, and was held in high esteem by the profession and much respected by the community in which he lived.

JOHN MACKALL ROBERTS, son of Charles and Ann Loker Roberts, was born in the city of Washington, D.C., June 11, 1815. Having received a primary education in the schools of his native city, he commenced the study of medicine with Dr. Thomas Sewall, in the spring of 1833, attending his first course of lectures at the National Medical College of Washington, D.C., and afterwards attended two courses at the Jefferson Medical College at Philadelphia, from which institution he graduated March 14, 1836, writing on "Hernia Humoralis" as the subject of his inaugural thesis.

Dr. Roberts at once entered upon the practice of his profession in the city of Washington, and remained actively engaged until

within a few months of his death. On the 18th of October, 1838, he intermarried with Matilda C. Elder.

Dr. Roberts held many positions of honor and trust, and at the time of his death was a member of the Medical Association and Medical Society of the District of Columbia, a vestryman of the Protestant Episcopal Church (Christ Church, Washington, D.C.), a director of the Bank of the Metropolis, and a director of the Franklin Insurance Company—all of which bodies passed resolutions expressive of their loss. He died September 11, 1865, aged fifty years; his remains were interred in the family lot at the Congressional Cemetery, and he leaves behind him a son, Dr. Wm. E. Roberts, who has already been for some years engaged in the practice of his father's profession.

WILLIAM B. MAGRUDER was born in Baltimore, Maryland, on February 11, 1810. His parents were James A. and Millicent Magruder. He studied medicine with Dr. Benj. S. Bohrer, of Georgetown, D.C., and graduated at the University of Maryland, in 1831, selecting "Hydrophobia" as the subject of his thesis, practising his profession in Georgetown until the summer of 1832, when, the cholera epidemic having driven away the physicians resident in that section of Washington City known as the First Ward, he was called by the citizens to take charge of a cholera hospital, and was the only active physician in that section during its prevalence. In the practice of his profession he gained a most enviable reputation, and his popularity has hardly ever been exceeded by any practitioner. His patients were so much attached to him that even in cases of severe illness they would wait for two or three days before employing other physicians. He loved his profession for the good he was enabled to do, and, whilst he devoted his whole life to his profession, at his death his family found that pecuniary gain had not fallen to their lot through him. With all his talents, and they were many, carelessness in money matters and habits of irregularity caused this lack of provision for the future.

Dr. Magruder was connected with the city government for nearly thirty years. From 1856 to 1858 he was Mayor of the city. In the councils of the city he distinguished himself as a ready and eloquent speaker, always expressing himself in the clearest and most forcible manner. As a lecturer and public speaker his abilities were well known and highly appreciated by those who heard him. In one of the happiest extempore efforts he ever made

as a lecturer, he selected as his theme a spool of cotton, and for two hours riveted the attention of his audience.

On March 2, 1843, he was made a mason by the Hiram Lodge, and was subsequently elected Worshipful Master, filling the position with great credit, and in 1854 was elevated to the position of Most Worshipful Grand Master, and it is unnecessary to say that he still lives in the memory of the fraternity in this jurisdiction.

Dr. Magruder was married twice, and left a widow and daughter. He was very fond of children and flowers, and spent the early morning in his garden, cultivating his plants, where he saw and prescribed for many of his patients. He wrote several articles on various topics, and some beautiful lines upon flowers. He died May 30, 1869, from an obscure disease of the stomach, losing eighty pounds of flesh in the course of four months, with an inability to retain food in any quantity, the stomach being enlarged to the capacity of more than a gallon, with thickened walls and extending as low as the umbilicus. His remains were interred at Oak Hill Cemetery, Georgetown, D.C.

GEORGE LAURIE PANCOAST, son of Samuel Abbott Pancoast and Rachel Newbold his wife, was born on the 9th day of December, 1838, in Burlington County, New Jersey. His father removing to Hampshire County, Virginia, while he was yet young, his academical education was carried on under the care of Mr. Benjamin Hallowell, of Alexandria, Virginia. He studied Medicine with his uncle Dr. Joseph Pancoast, Professor of Anatomy in the Jefferson Medical College of Philadelphia, Pennsylvania, from which institution he graduated with much distinction in 1859, and almost immediately sailed for Europe, going out as physician on board the Saranack, sailing between Philadelphia and Liverpool. Making but a brief stay, he returned to Philadelphia, and opened an office in that city for the practice of his profession.

At the beginning of the Rebellion, he received an appointment from Governor Curtin as Assistant Surgeon in the Pennsylvania Reserves, and joined the regiment of Colonel Sickles at Easton. He accompanied his regiment to Washington, and in October of the same year was promoted to a full surgeoncy in the Volunteer Service of the United States.

His singular ability, energy, and conscientious discharge of duty now led to further advancement. As surgeon-in-chief of one of the divisions of the army, he went through the seven days' fight

of the Peninsular Campaign. His duties here were of the most arduous character. Ever at one of the field hospitals he worked with unabated professional zeal at each post till the roar of shifting battle led him elsewhere. There was little time for rest or repose in this active campaign, and he arrived at Harrison's Landing in a state of physical exhaustion.

His health received a shock from these exhausting duties from which he never entirely recovered.

He accompanied the army through the Second Bull Run Campaign, and was subsequently made Medical Director of the Calvary Corps, and in that capacity served with General Stoneman through his Virginia Campaign. Finding the arduous and exposed life of the field telling upon his health, and also desirous of seeing something of hospital practice, and the after-treatment of gunshot wounds, he made application to be transferred, upon which application Dr. Jonathan Letterman, then Medical Director of the Army of the Potomac, made the following endorsement. "The services of Surgeon Pancoast, in the various positions which he has held in the army from Surgeon of Brigade to Medical Director of a Corps, have been of the most satisfactory character. He is an officer of ability and reliability. I shall be sorry to lose him from the army, and yet I think his services entitle his request to a favorable consideration."

At the period of being relieved from duty with this corps, General Alfred Pleasanton, then in command, General Order No. 5 was issued, in which the General Commanding took occasion to express in the most complimentary manner his appreciation of the services rendered by Surgeon Pancoast during his tour of duty with the corps.

While still Medical Director of the Corps, Surgeon Pancoast addressed a communication to the Cavalry Bureau at Washington, in relation to the establishment of hospitals at Cavalry Depots, which suggestions received the warm approval of Dr. Letterman, who expressed his opinion that the proposed plan would be of great benefit and recommended its adoption.

In February of 1864 he left the field, and, coming to Washington, was assigned to the charge of Finley General Hospital, one of the largest Government Institutions of the kind in the District. The discharge of his duties at this place met with the high commendation of his superior officers.

He left the army at the close of the war with the rank of Lieut.-

Colonel, and returned to the private practice of his profession in connection with Dr. W. P. Johnston, a leading physician of Washington, D. C. His health, however, continuing to decline, he, at the solicitation of his uncle, Dr. Jos. Pancoast, passed a year with him in Southern Europe, in the hope of its restoration. He returned in August, 1868, with this hope unrealized, and died in Washington of pulmonary phthisis on the 15th December, 1869. The Medical Society of the District of Columbia, of which he was a member, passed resolutions expressive of the deep regret felt for the loss to the profession and society, and resolved to attend the funeral in a body.

Dr. Pinckney, then Rector of the Church of the Ascension, now Assistant Bishop of the Diocese of Maryland, in pronouncing a short funeral oration, used these words: "Had he lived he would have occupied a position which the most ambitious must have envied, and the most envious could but have admired." A fitting tribute to the genius and talents, as well as to those virtues of which Dr. Pancoast was so eminently possessed.

During his term of service with the Army of the Potomac, and until the untimely death of each, Generals Birney and Kearney were his warm personal friends, and letters of affection and esteem passed between them.

An act of bravery performed under General Kearney's observation called forth a public recognition of the fact in the honorable mention of Dr. Pancoast's name in his report to Washington.

So passed his brief but brilliant life. He was faithful to every duty, loving and true to family and friends, an ornament to the profession he had chosen, and a useful and honored member of society. His remains rest in a quiet spot, but his bright spirit with that Eternal Being into whose hands he resigned his all.

An eminent Surgeon, whose fame is world-wide, says of Dr. Pancoast, "The Medical Profession incurred a severe loss in the death of Dr. Pancoast, who had given promise of much future usefulness. He was by nature singularly quiet, in manner undemonstrative and totally unobtrusive, and was endowed with a maturity of judgment beyond his years. Uprightness and integrity, which were native to him, were displayed in every post he filled, and so conscientious was he in the full discharge of all his duties, that he never failed to win the affection of all with whom he was intimately associated."

The following lines, by the late lamented Prof. Robley Dunglison, of Philadelphia, on the death of the subject of this memoir, have a somewhat mournful interest, as that distinguished gentleman was then laboring under a malady that he knew was soon to prove fatal:—

"When age, all honored and with deep regret,
Lies down in peace to pay the civil debt,
'Tis weakness most unmanly to deplore
The loss of one who values life no more.
But when fair youth, which every promise gave,
Deposits all his hopes within the grave,
Who is not apt to judge the fate severe
And mingle with the rest his sorrowing tear?"

EDWARD DE WELDEN BRENNEMAN was born at Lancaster, Pennsylvania, August 14, 1839; his parents were Abraham N. and Mary De Welden Brenneman. He graduated at the University of Pennsylvania, Philadelphia, on March 14, 1861, selecting osteosis as the subject of his thesis. On September 27, 1866, he married Marian D., daughter of William and Huldah Wilson, of Washington, D. C., and had by her a son and daughter. Upon the breaking out of the rebellion, he was appointed an Assistant Surgeon of the First Pennsylvania Reserves. After the expiration of the three months' term of service, he became an Assistant Surgeon of the United States Army, and a member of General Grant's Staff. Soon after the close of the war, he retired from the army and practised his profession in Washington City, D. C., where he died on October 10, 1870, of consumption, and was buried in Oak Hill Cemetery, Georgetown, D. C. The doctor was an accomplished linguist, as he understood seven languages, and spoke five with fluency. At the time of his death he was a member of the Medical Society of the District of Columbia.

J. F. J. MCCLERY was born in Washington, D. C., January 24, 1820. His parents were natives of Maryland, but had resided in Washington since it became the seat of government, and the doctor was reared and educated here, graduating from the National Medical College, Washington, D. C., on March 9, 1842. Soon after receiving his degree, he accompanied the Hon. Robert Dale Owen on an exploring expedition through the Western States, and upon his return commenced the practice of medicine in his native city, but soon after was induced to remove to Loudon

County, Virginia, where he resided and practised his profession until the beginning of the war in 1861, when he offered his services to the State of Virginia, and received a surgeon's commission in the Confederate Armies. After the war, in July, 1865, he embarked for South America, and soon obtained a Surgeon's commission on board a vessel bound for China, where he remained three years. Returning again to Washington, he entered upon the practice of medicine, but failing health compelled him to desist, and after an illness of six weeks he died of Bright's disease of the kidneys, February 16, 1871, deeply mourned by many of his professional and personal friends.

He was a member of the "Medical Society, D. C." and the "Medical Association, D. C." Just before his death he began a translation of Orfila's Traité de Toxicologie, with annotations, but the work was left unfinished. His characteristics were those of a warm hearted, high toned gentleman. Holding the honor of his profession above every other consideration, his life was marked by a strict and unswerving adherence to principle which no blandishments of fortune could tempt.

THOMAS F. MAURY was born in the City of Washington on August 16, 1835, and commenced the study of medicine under Dr. John Frederick Mazin, 1852, attending lectures for two sessions at the University of Virginia, Charlottesville, and graduating in 1856 at the University of Pennsylvania, Philadelphia. He went to Europe in May, 1856, and continued his studies for a year and a half in the hospitals of Paris and Vienna. On his return to Washington in 1859, he married and commenced the practice of his profession. When the Southern States withdrew from the Union he determined to go with them, and in April 27, 1861, he was appointed Assistant Surgeon of the First Virginia Regiment, with the rank of captain. He was engaged in the first battles of the war near Manassas, soon after which he was promoted to full Surgeon, and appointed upon the staff of General Longstreet, in which capacity he continued until the surrender at Appomattox Court House, participating in nearly all the battles of the "Army of Northern Virginia."

When on duty at Greenville, Tennessee, with General Longstreet's Corps, on one occasion being about to mount a horse just purchased, which his boy held by the bridle, the animal jerked off his headstall, ran away, and dashed into a wagon train. The

doctor was thrown violently against one of the wagons, and sustained a comminuted fracture of the right femur, which was of such a serious nature that Surgeon Gibson, of Richmond, decided, at one time, upon amputation. He recovered the use of the limb with no greater inconvenience than a slight shortening, but never entirely from its effects.

He returned to Washington after the close of the war, and commenced the practice of medicine, but his health began to fail him, when he again, May, 1869, visited Europe to recuperate; and after an absence of six months returned much benefited and improved. He continued the practice of his profession until forced to succumb to his disease, and died September 19, 1871, at Mount Holly Springs, Pennsylvania, of phthisis pulmonalis.

ILLINOIS.

MANNING FORCE DE WITT was born in Essex County, New Jersey, July 9, 1835.

While quite young his father removed to Pennsylvania. His early education was received at South Eaton, Wyoming County, Pennsylvania. He then entered Jefferson Medical College at Philadelphia, and received the degree of M.D. from that institution on March 7, 1857. In the spring of 1858 he began the practice of his profession at White Hall, Illinois, where he resided until the time of his death. He married Miss Harriett Prettyman, an accomplished lady of Washington, D. C., who died ten years after the marriage. Dr. De Witt, while in the active discharge of his professional duties, was attacked with pericarditis on the 18th of April, 1870, from which he died three days after, at his residence in White Hall, Illinois.

His biographer, Dr. J. B. Hamilton, of Kane, Illinois, says, "The late Dr. De Witt did not often commit the fruits of his ripe experience and varied reading to paper; and, if we except the essays to the medical societies of Jersey and Greene Counties, some of which were published at the request of the societies in the county papers, we can only find one article from his pen, and that one in *The American Journal of the Medical Sciences*, for April, 1868, entitled 'Amaurosis of Right Eye, relieved by the removal of the filling of a carious tooth of corresponding side, and final cure by the removal of the tooth.' . . . . We cannot refrain from saying a word commendatory of his skill in the treatment of disease, his

superior excellence as a surgeon, his laudable zeal in the promotion of worthy objects, and his regular attendance upon the meetings of the various medical societies of which he was a member. The death of an intelligent, hard-working physician is an event always to be deplored in any community, but, when that physician unites in himself the studious habits of the scholar with social qualities which endear him to all classes, such event becomes a public calamity."

INDIANA.

NATHAN JOHNSON, of Cambridge City, Indiana, died January 4, 1872, at the advanced age of seventy-seven years. He was born in Loudon County, Virginia, and in his early youth removed to Belmont County, Ohio, where he remained until 1839, when he removed to Cambridge City, Indiana, where he remained until the time of his death. He obtained license to practise medicine in 1830, from the Medical Society of the Seventeeth Medical District of Ohio, according to the law at that time regulating the practice of medicine. He attended the University of Pennsylvania during the session of 1834 and 1835, and afterward received the degree of M.D., from Starling Medical College at Columbus, Ohio.

Dr. V. Kersey, of Richmond, Indiana, in a sketch of the life of Dr. Johnson, says, "He was a good physician; had not a tinge of charlatanry in his composition, and was the soul of courtesy in his intercourse with the profession. Dr. Johnson assisted in organizing the Indiana State Medical Society, and was an efficient and life-long member. He was active in getting up and maintaining in working order the Cambridge City and Wayne County Medical Societies, and was for many years a member of the American Medical Association. . . . . He possessed a good and highly cultivated understanding, was remarkable for steady adherence to truth and duty, and his life presented a bright example of uprightness, purity, and benevolence."

DANIEL D. HALL, was born in King and Queen's County, Virginia, November 8, 1803, and died at Connersville, Indiana, June 30, 1871. He began the study of medicine in Virginia, and graduated at the University of Maryland in 1828. For seven years he practised his profession in his native State, and in 1835 he removed to Connersville, Indiana, where he remained up to the time

of his death. His professional career extended over forty-seven years. After more than a year of suffering, he determined to subject himself to the operation of lithotomy, which was performed by Dr. Morris, of Venice, Ohio, on June 12, 1871, which he only survived ten days.

Dr. Hall was an honorable and conscientious practitioner of medicine, a valuable citizen, and a Christian gentleman.

KENTUCKY.

JOSHUA TAYLOR BRADFORD was born in Bracken County, Kentucky, on the 9th day of December, 1818, and died in Augusta, Kentucky, on October 31, 1871, of hepatic abscess.

He was the son of William and Elizabeth (*née* Johnson) Bradford, who emigrated from Virginia to Kentucky in 1790, and he prided himself a little, on being the seventh son of the seventh son for three generations. Among his brothers are Colonel L. J. Bradford, the present President of the Board of Visitors of the Kentucky University, and Dr. J. J. Bradford, with whom he studied medicine.

His academical education was received at Augusta College, and his medical degree was taken at Transylvania University in 1839.

Dr. Bradford acquired much distinction as a surgeon in Kentucky, and his extraordinary success as an ovariotomist, in his latter days, extended his fame far beyond the limits of his State. Indeed, as far as we know, the results of the operation in his hands are unprecedented, for his nephew, Dr. J. Stuart Bradford, informs us that, at the time of his death, he had "performed thirty operations, with but four deaths."

Though Dr. Bradford did not write much for the medical press, yet what emanated from his pen was well written, clear, and vigorous. It is said that he projected a book on Surgery, but what he actually did towards accomplishing its completion, we do not know.

Dr. B. was a great lover of nature, and took much interest in agricultural affairs and field sports. For many years he was President of the Mason and Bracken County Agricultural Society, and is said to have been "the crack-shot on the wing of the Hunting Club." His large vineyard and wine-cellar were models of order and neatness, and no dairy was cleaner or in more perfect order, and his home was the scene of refined tastes.

HUGH RODMAN was born in New Castle, Henry County, Kentucky, on the 4th of June 1818, and died February 5, 1872. Dr. Rodman was left fatherless in his youth, and the support of his widowed mother and family, to a great extent, devolved upon him. This he accomplished by manual labor, working at his trade, that of cabinet maker, yet devoting all of his leisure time to the study of his profession. His industry and economy enabled him to support his mother and younger brothers, who were dependent upon his exertions for a living, and, in addition, to accumulate a small surplus, by which he was able to devote more time to his studies. In 1839 he attended a course of lectures; and in 1841 he graduated at the "University of Louisville." He at once began the practice of his profession at Lagrange, Kentucky, and in 1850 removed to Frankfort, Kentucky, where he lived, practising his profession to the time of his death. He left his home in Frankfort, on the morning of February 3, to go to Newcastle; after leaving the cars at Eminence, he started for Newcastle in a buggy; in trying to pass the stage on the road, he was thrown from his buggy, and his left clavicle was fractured, besides receiving other injuries, from which he died.

Such was the standing of Dr. Rodman as a physician, a gentleman, and a citizen, that both houses of the State Legislature and the Court of Appeals adjourned to attend his funeral. The Mayor also ordered the closure of the city offices, and requested that the business houses of the city be closed during the funeral obsequies.

His brother, Dr. James Rodman, says of him, "governed strictly in his intercourse with others by a rigidly interpreted code of ethics, he was never the occasion of those bickering jealousies that in some communities have led to a most unhappy state of things—he demanded from all only that which he was willing to accord. Actively charitable, he was the idol of the poor. His ministrations to the sick poor were as often in the shape of food, raiment, and shelter, as in professional attention; his consultations were frequent, and were held with the physicians of all the neighboring counties. . . . . He was not inclined to give publicity to the facts gathered as the results of his experience. He wrote little; often solicited by editors to write for their journals, he usually declined, alleging the reason that his time was too fully occupied to allow that thorough preparation of an article which should characterize a paper intended for the information of others." His

son, Dr. W. B. Rodman, of Frankford, Kentucky, says: "My father's life illustrates this one fact; that a man may begin under the most inauspicious circumstances, with no education, and no means of obtaining any except his own endeavors, and may become not only a good general practitioner, but also obtain such necessary knowledge of the classics, as any practitioner might be proud of."

WILLIAM PAWLING was born at Cherry Spring, Scott County, Kentucky, September 16, 1797. His widowed mother removed to Lancaster, Ganard County, Kentucky, when he was about nine years old, at which place he resided until he was twenty-one years of age. Having previously devoted three years to the study of medicine, he entered on the practice of his profession at about this time, and about two years afterward removed to Harrodsburg, Kentucky. In 1832 he located at Lexington, Kentucky, and, practising his profession there, he passed through the terrible epidemic of cholera which visited that place in 1833. In 1839 he removed to Danville, Kentucky, and continued the practice of his profession in that place until the time of his death, which occurred April 4, 1872. Dr. Pawling was twice married. He was married to Miss Elizabeth Clelland, daughter of the late Reverend Thomas Clelland, at the beginning of his professional career. She died after a few years of married life. At the age of twenty-seven, he was again married to Miss Catharine M. Bridges, daughter of the late Judge John L. Bridges, of this State, who yet survives him.

He attended his first course of lectures at the University of Pennsylvania, and subsequently received his degree from Transylvania University.

At the time of his death, Dr. Pawling was probably the oldest medical man engaged in active practice in the State of Kentucky, having followed his profession continuously for fifty-five years; and the deep interest which he took in medical organizations, and everything appertaining to the advancement of professional knowledge to the last, was for one at his time of life remarkable. At the meeting of his County (Boyle) Medical Society, and the "Central Kentucky Medical Association," the venerable form of Dr. P. was as regularly looked for as that of any of the junior members. In 1868 he was elected president of the Kentucky State Medical

Society, and presided at the meeting of the following year in Lexington.

In his relations of physician, citizen, and head of a family, he enjoyed the confidence and respect of the entire community; and, as he toiled on steadily and uncomplainingly, bearing his full share of the evils of this life, with all the fortitude of a true Christian, falling with armor still on, Dr. Pawling has left much for our imitation.

MARYLAND.

JAMES BORDLEY was born in Talbot County, Maryland, December 8, 1808. He began the study of medicine in Baltimore, in the office of the elder Samuel Baker, M.D., professor of materia medica in the University of Maryland, after obtaining a good preliminary education. He graduated with honor at this institution in 1829, and soon after complied with the law then existing, and obtained a diploma from the Board of Examiners as L.M. (licentiate in medicine). He practised medicine with his preceptor, Dr. Baker, for six months, and then removed to Talbot County, where he remained practising his profession until 1834, when he removed to Centreville, where he remained until 1849, commanding, during this time, a very large practice. In 1849 he removed to Baltimore, and entered into partnership with Dr. Theobald, which partnership existed until the death of Dr. Theobald in 1857. He remained in Baltimore in fine practice until his failing health compelled him to remove into the country in 1862. He then returned to Centreville, where he died December 6, 1870.

From the information we have been able to obtain in regard to the life of Dr. Bordley, he was certainly a man of ability as a physician, a classical scholar, and a true gentleman.

JOHN R. W. DUNBAR was born about the year 1804, in the town of Winchester, in the valley of Virginia, where his father practised the profession of medicine. His preliminary education was acquired at Dickinson College, Pennsylvania, at which institution he took the degree of Master of Arts; and subsequently he graduated in medicine at the University of Pennsylvania.

During the period of his attendance upon medical lectures, his studies were prosecuted under the guidance of a physician distinguished for the great extent of his professional learning, Dr. John

Bell, of Philadelphia, who recently died, at a very advanced age. After graduating in his profession, Dr. Dunbar, for some time, filled the position of Resident Physician at the Pennsylvania Hospital, and on leaving that clinical school he settled for several years in the practice of medicine in his native town of Winchester. In 1830 he removed to Baltimore, where he became extensively engaged in practice, and in a few years was appointed to the chair of surgery in the Washington University. After some years he resigned his connection with this school, but, being interested in teaching medicine, he established in Baltimore a private medical institute, in which instructions were given by himself in all the branches of the science. As a teacher, Dr. Dunbar was very popular with his students, on account of his profesional accomplishments and facility in imparting information, as well as from the attractions of his manner and character. For a number of years his institute was well attended. It made no pretence of filling the place of a regularly organized medical college, but was designed mainly to be subsidiary in its instructions to the School of Medicine in the University of Maryland. During the long period in which he was engaged as a teacher of medicine, large classes gathered around Dr. Dunbar, and some, no doubt, who read these pages, will recall with pleasure the days of their undergraduate course, which were passed in genial and profitable companionship with him.

For some years previous to his death Dr. Dunbar had, to a great extent, withdrawn from the active duties of his profession, though he never entirely relinquished them until the occurrence of the short illness which ended his life, at the age of sixty-seven, in August, 1871. He was for many years an earnest and devout member of the Protestant Episcopal Church, serving as vestryman of the Parish Church which he attended, and representing it in the Diocesan Convention.

ALEXANDER C. ROBINSON was born in the year 1810, in the city of Baltimore, where he received his elementary education. His academic course was completed at Yale, in 1831. From an early age he had shown a fondness for books, and consequently became remarkable for his fine taste and command of pure language. His appearance was strikingly interesting, and his grace of manner and voice highly attractive. He was an ardent lover of his pro-

fession, and soon qualified himself to become a teacher of anatomy and a clinical lecturer, which positions he filled with distinguished honor and success, not only as a private anatomist, but also in the medical department of the University of Maryland, and in the Baltimore Almshouse, a school of practice that has given a larger number of highly qualified members to our profession than any other similar institution in the State.

In private practice Dr. Robinson was no less admired, and was greatly beloved by his patients. He was not only the professional administrator, but the friendly adviser in most of the families he attended.

His personal qualities were such as to attract and bind to him all who came within his sphere; and his hospitality, charity, and benevolence caused him to be universally loved, respected, and honored.

His gradually failing health compelled him, during the latter years of his life, to retire from the field of his active labors to his home in the country, whence, however, bearing up with indomitable energy against the advance of exhausting pulmonary disease, he would, from time to time, return to engage in professional duty. At length his physical prostration became so great that the strength of will with which he was so remarkably endowed could no longer avail against it, and on the 9th November, 1871, he died. Few men have lived in our community whose virtues are more generally acknowledged or whose memory will be longer cherished. The profession of medicine has in him lost one of its brightest ornaments, and the society in which he moved one of its purest and most polished members. Dr. Robinson was for many years a faithful and earnest member of the Presbyterian Church.

GEORGE S. GIBSON was born in Richmond, Virginia, on the 11th of December, 1800.

The foundations of his education were laid in England and Holland, to which countries he was sent at a very early age, and where his studies were so judiciously directed that he became a good scholar in both ancient and modern languages. His scholarship he retained in a remarkable degree to the last days of his life.

On his return to America about 1818 or 1819, he applied himself to the study of medicine, and graduated with the class of 1823 in the medical department of the University of Maryland. His medical studies were prosecuted under the direction of Dr.

Patrick Macaulay, a gentleman who enjoyed a high reputation for talents and professional attainments, and who, after Dr. Gibson's graduation, retired from practice in his favor. The untiring devotion of Dr. Gibson to medical science soon placed him in the foremost ranks of the profession, a position which he maintained for forty years, respected and honored by his colleagues, with whom he always stood *sans tâche et sans reproche*, and enjoying the confidence and the love of those who were under his professional care. He retired from the general practice of his profession about 1862 or 1863, though still continuing in occasional attendance upon some of his *clientell* who were unwilling to pass from under his care. For a long time Dr. Gibson was chairman of the Medical and Chirurgical Faculty of Maryland, the highest representative position which the collective profession in his State could bestow. Professorships were repeatedly offered to him in this and other States, which, however, he would not accept, preferring to devote himself exclusively to the duties of a practitioner, rather than to those of a teacher of medicine.

He lived for many years a member of the Presbyterian Church, and in that communion he died, January 30, 1872.

MICHIGAN.

ZINA PITCHER was born in Washington County, New York, April 12, 1797, of parents who endured the many hardships incident to a residence in this country, during the struggles by which the colonies achieved their independence. His father died when he was five years of age, leaving a widow with five children, all depending upon the results of the culture of an unimproved plantation. But his mother, appreciating the value of an education, availed herself of the district school and county academy to educate her children. Dr. Pitcher, at the age of twenty-one, began the study of medicine with a private practitioner, with whom he spent four years, attending, however, during the time, two courses of lectures at the Castleton School of Medicine, in Vermont, and in 1822, he received the degree of M.D., from Middlebury College. During his professional studies, feeling the necessity of some knowledge of the classics, he engaged a fellow student to act as his private tutor, to remedy his deficiencies in this respect. After receiving his medical diploma, he immediately obtained an appointment in the army as Assistant Surgeon from the administra-

tion of President Monroe. When he was appointed, he had never received a single clinical lesson. During the administration of Andrew Jackson, he was promoted to the rank of Surgeon. He became a citizen of Michigan in 1836. He took a very deep interest in the organization of her educational institutions, assisting in their organization. He was Regent of the University from 1837 to 1852, and the medical department is essentially the work of his hands. When the faculty was appointed, at its request his name was placed on the catalogue as an Emeritus Professor, where it remains to this day. He was three times chosen Mayor of Detroit. He took a very active part in the establishment of free public schools in Detroit, and this he regarded as the achievement of his life. From 1848 to 1857 he was physician and surgeon to St. Mary's Hospital; also surgeon of the U. S. Marine Hospital, at Detroit, during Mr. Buchanan's administration. During the whole time of these public engagements, he never intermitted his exertions as a private practitioner, always, when possible, taking the time to attend the meetings of the American Medical Association, being elected President of that body at its meeting in Detroit.

His literary productions consist of addresses made to county, State, and national medical societies, reports on medical education and epidemics to the American Medical Association, and also to the city Board of Health, also numerous contributions to the *Peninsular Medical Journal* of which he was one of the editors for a number of years. Dr. Pitcher died at his residence in Detroit in April, 1872, at the advanced age of nearly seventy-five years, after a severe illness of several weeks.

MINNESOTA.

E. HERMAN SMITH, aged twenty-nine years, residence at St. Paul, Minnesota, graduate of the College of Physicians and Surgeons of New York, for a time one of the Physicians of Bellevue Hospital, formerly Secretary of the State Medical Society of Minnesota. A true member of his profession.

Our hearts are tombs
That enclose the remembrance of such a friend.

PERRY CHANCE, born September 8, 1834, at Alliance, Ohio.— Died November 19, 1871, at Delano, Minnesota, of ulceration of his bowels, a disease that he contracted in the Army of the Rebel-

lion. He was a graduate of Charity Hospital Medical College, Ohio. His friends loved him much.

> One after one of the brave like him
> Go up the path to Immortality.

PETER E. KIERLAND, a graduate of the Rush Medical College of Chicago, Illinois, aged twenty-four years, died at Rushford, Minnesota, January 29, 1871, of phthisis pulmonalis.

> He will not miss the haven of hope,
> With God at the helm.

NEW HAMPSHIRE.

WILLIAM D. BUCK was born at Williamstown, Vermont, March 25, 1812. When quite a young man Dr. Buck went to Concord, and was employed for several years as a carriage painter. In accordance with a desire long felt, he commenced the study of medicine with the late Dr. Thomas Chadbourn, of Concord. He graduated at the College of Physicians and Surgeons, New York, and began the practice of medicine in Concord, in 1840. In 1846, he visited Europe, and on his return opened an office in Manchester, where he remained until his death occurred. Dr. Buck was first married to Miss Grace Low, of Concord, who died 1856, and four years afterward he married Miss Mary W. Nichals, of Litchfield, who survives him. He left no children. Dr. Buck was a man of attainments as a medical man, was twice president of the State Medical Society, and his professional services will be missed by a large number of persons. He was a man of decided opinions, and not easily influenced, yet genial and companionable, and a large number of friends miss his social companionship as well as his professional services. He died at his residence in Manchester, on January 9, 1872, of heart disease.

NEW JERSEY.

JAMES HENRY STUDDIFORD was born in Lambertville, New Jersey, September 12, 1832. He commenced the study of medicine in the office of his uncle, Dr. Josiah Simpson, of the U. S. Army, stationed at Bedloe's Island, New York Harbor, in 1852. He graduated at the University of New York in 1854. He then became Assistant House Surgeon in the hospital on Blackwell's

Island, and remained there nearly two years. In August, 1857, he removed to St. Paul, Minnesota, but returned to his native place in New Jersey in 1859. Here he remained to the time of his death, which occurred March 23, 1870. "He was charitable in his opinions of others, kind and considerate towards all, envious of none."

DANIEL BAKER died at Chatham, Morris County, New Jersey, March 16, 1870. He was formerly of New York.

JAMES WARREN died at Madison, Morris County, New Jersey, August 9, 1870, in the seventy-sixth year of his age.

JOHN ARMSTRONG died at Princeton, August 20, 1870, in the seventy-second year of his age.

ALFRED B. DAYTON died at his residence in Mattawan, Monmouth County, July 19, 1870. He was born in Somerset County, New Jersey, in 1812. He was a graduate of the College of Physicians and Surgeons, New York, and was a very active and popular practitioner. He was president of the Medical Society of New Jersey in 1854, and since 1858 a member of the American Medical Association.

CHARLES C. CLARKSON died in the city of Newark, on January 9, 1871. He was a physician of the City Dispensary, and during the late war a Surgeon in the navy.

EVAN DUDLEY died near Moorestown, Burlington County, February 10, 1871, at the age of twenty-eight years.

NEW YORK.

HENRY D. BUCKLEY was born in New Haven, Connecticut, on April 4, 1804, where he spent his youth. After devoting the usual time to preparatory studies he entered Yale College, and graduated at that institution in 1821.

Having chosen the medical profession as the field of his life's labor, he entered the office of Dr. Jonathan Knight, and after passing through the usual course of study he graduated in the Medical Department of his Alma Mater. In 1831, he went to Europe, and

while there devoted himself especially to cutaneous affections. Ten years afterward he again visited Europe, but only to spend a few months of rest from professional labor. In 1846 and in 1853, in the capacity of editor, he placed before the profession editions of the works of Cazenave and Schedel on Cutaneous Diseases, and afterward he also edited *Lectures on the Eruptive Fevers*, by George Gregory. Living in New York City during his whole professional career, he was among the first in this country to deliver a course of lectures on skin diseases, and also among the first to write a treatise on *Infantile Syphilis*. In 1848 he was appointed attending physician to the New York Hospital, which position he filled faithfully up to the time of his death. At the time of his death he held the following responsible positions: Consulting Physician to the New York Dispensary, of the New York Dispensary for Diseases of the Skin, of the Nursery and Child's Hospital; Trustee of the New York Academy of Medicine, of the New York Medical Library and Journal Association, President of the New York Dermatological Society. Dr. Buckley was a man of industry, skilful in diagnosis, and equally so in treatment of diseases, and was for many years acknowledged to be an expert in the department of cutaneous medicine. He possessed all those qualities which characterize the true gentleman, and with his extensive information acquired the respect and esteem of his professional brethren. He died of pneumonia at his residence in New York City, on January 4, 1872, in the sixty-eighth year of his age.

The New York Academy of Medicine, the Medical Society of the County of New York, and the New York Medical and Surgical Society, each passed resolutions expressing the deepest regret at his loss, and commemorative of his many excellent traits of character as a gentleman, evinced both in public and private life; also recognizing his abilities as a medical man, demonstrating in his contributions to medical literature his long and faithful service in hospitals and infirmaries, as well as in private practice.

SOUTH CAROLINA.

JOHN EDWARDS HOLBROOK was born in Beaufort, South Carolina, December 31, 1796, and died at Wrentham, Massachusetts, on September 8, 1871, being a little over seventy-one years and eight months of age at the time of his death. While an infant his parents removed from Beaufort, South Carolina, to Wrentham,

Mass., and at the latter place he spent his childhood and youth. At the proper age he was sent to Brown's University; after graduating here, he began the study of medicine at the University of Pennsylvania, and received the degree of M.D. at this institution in 1818. He then went to Europe, and visited the principal schools there, and returned to this country in 1822, and entered upon the practice of his profession in Charleston, South Carolina. Upon the organization of the Medical College of South Carolina, he was elected to the chair of Anatomy, which position he occupied for more than thirty years, and was compelled to resign on account of his failing health. In 1827 he marrried Miss Rutledge, of South Carolina, a talented and highly accomplished lady. His health was poor during the last years of his life, and he visited his relatives in Massachusetts during the summer, and here, at the scene of his youthful days, he died of apoplexy on September 8, 1871, at the residence of his sister. Dr. Holbrook possessed the faculty of making himself very agreeable, and attaching every person to him with whom he was thrown; as a practitioner of medicine his manner won the entire confidence of his patients. Yet as a medical man there were some things in his character which made him appear very peculiar. He never attended an obstetric case during his whole professional career: nor would he ever perform a painful surgical operation. He would plan an operation, speak of all its details, and assist in the preliminary steps of the operation, and then withdraw from the room. It is supposed that his great aversion to witnessing the sufferings of patients was the cause of these peculiarities. Dr. Holbrook, as a lecturer on Anatomy, commanded the close attention of all who attended his lectures. In addition to a thorough knowledge of human anatomy, his acquaintance with comparative anatomy made him doubly attractive. His proficiency in natural history obtained for him a reputation not only in this country but also in Europe. Some idea may be formed of his appreciation abroad when we learn that, after the publication of his work on Herpetology in 1842, he visited Europe, and was invited by the chief naturalists in Paris to place *his own* labels on the animals in the Jardin des Plantes, some of which were improperly named. After the publication of this work, Dr. Holbrook began a work on Ichthyology, entitled *The Fishes of South Carolina;* only two volumes of this work, however, were published, the house in Philadelphia in which were the plates and materials of the work

being destroyed by fire. The late war then followed, and put an end to his labors in this direction.

Dr. T. L. Ogier, of South Carolina, says, in his memoir of Dr. Holbrook, "As a lecturer on anatomy, Dr. Holbrook possessed qualities which were never surpassed and seldom equalled; with a thorough knowledge of the structure of the human body, and a peculiar talent for description, he brought his knowledge of comparative anatomy to enforce and enlighten his demonstrations, which made his lecture not only instructive but most delightful to listen to."

His friend, Prof. Louis Agassiz, in a sketch of the life of Dr. Holbrook delivered at a meeting of the Natural History Society of Boston, says, "I well remember the impression made in Europe, more than five and thirty years ago, by his work on the North American reptiles. Before then, the supercilious English question, so effectually answered since, 'Who reads an American Book?' might have been repeated in another form, 'Who ever saw an American scientific work?' . . . . In that branch of investigation, Europe had at that time nothing to compare with it."

WEST VIRGINIA.

In our report we would notice the death Dr. G. A. HAMILL, of Berkeley County, West Virginia, but the information we have been able to obtain gives us very little in regard to his character and works. He practised medicine for many years at Martinsburg, Berkeley County, West Virginia, and during the late war served as a surgeon in the Confederate Army, and was one of the vice-presidents of the Medical Society of West Virginia. At the time of his death he was about fifty-five years of age.

WISCONSIN.

HENRY M. LILLY was born in Columbus, Chenango County, New York, on January 4, 1831, and died in Fond du Lac, Wisconsin, November 28, 1870, being, at the time of his death, one month less than forty years of age. His father, grandfather, and great-grandfather, and four of his immediate ancestry on his mother's side, were highly respected Christian ministers. His mother, a lady of much culture, was a sister of the historian J. T. Headly. The subject of this notice pursued his studies under the direction of his

father, and thus prepared himself for the junior class in Beloit College, having chosen the ministry as the field of his labor.

In the autumn of 1853, he graduated at Beloit College, and soon after entered upon the study of his chosen profession at Union Theological Seminary, New York. At the close of his first year of study, on account of a tendency to pulmonary disease, he gave up with reluctance the profession of his choice, and in obedience to medical advice entered upon the study of medicine, as being likely to afford him more active and out-door labor. He read medicine with Dr. Thomas Allen, of Gorham, Oneida County, New York, attended lectures at Ann Arbor, Michigan, where he graduated with the second honor of his class in 1857.

In June, 1857, he moved to Fond du Lac, Wisconsin, and began the practice of medicine. During the latter part of the war he entered the service of the United States Goverment as a contract surgeon. During the war he performed duty in hospital at Nashville, Louisville, and Little Rock, and in such a faithful manner as to attract the favorable notice of his superior and associates in labor. After the close of the war he was retained in the service three years. During the whole term of his labors in military service, when his time was not occupied with his regular duties, he was engaged in careful research in the dead house. At the close of these three years, he returned to his home, and continued the practice of his profession there, "growing daily in the confidence and favor of the people, until June 8, 1870, when he was stricken down with pneumonia, from the sequelæ of which he died in the November following."

Dr. E. L. Griffin, of Fond du Lac, Wisconsin, his biographer, says: "Dr. Lilly possessed some traits of character worthy of notice. He was a man of commendable *modesty*, he made no parade of his acquirements. With all his varied attainments, he was no braggart; indeed, from his manner, one would scarcely believe him to be a man of extensive knowledge, for he was modesty itself. It was his motto to stand closely upon his merit; to rise in the public esteem, if at all, upon that basis; and, by a law of antagonism in our natures, this led him to despise all pretension, empirics, and boasters. He could not endure a quack or a hypocrite; his constitution and moral nature alike rebelled against those who profess one thing and practise another. He saw through and understood the tricks of the profession, and had a quiet way of taking down and letting down those whose pretensions exceeded their wisdom and skill.

Had he been less modest and more self-asserting he would better have fitted the age, and earlier enjoyed the public confidence. He seldom spoke in a way to injure persons of high or low degrees, and understood the art of overlooking small faults, and taking no note of them while seeing them. In his relations to his professional brethren, he was always affable and courteous, and was ready with words and acts of encouragement for them; especially was this the case in his relations to the younger members of the profession. He was genial and warm in his nature, and possessed of a quiet vein of humor, which made him an agreeable companion. . . . . His excellent traits of character as a man, a Christian, and a physician, so overshadowed all his faults and foibles as to make them appear small in the sight of all men." . . . .

"But the crowning excellence of his character was this, *he was a Christian.* As such he was sincere and unwavering. His mind rested with sweet and confiding trust upon the great truths of divine revelation, and his whole life exemplified and illustrated his inner spiritual conviction. The religious truth to which in active life his mind gave full assent, became, in his last hours, a great comfort and support to him. He was, in the truest sense of the word, a Christian gentleman, unselfish, unambitious for fame, simple-hearted, and true. He was a man whom his fellow physicians honored, friends loved, and enemies—he had none."

VIRGINIA.

ROBERT WILLIAM HAXALL was born in the town of Petersburg, Virginia, on the 1st of August, 1802, and died in Richmond on the 26th of March, 1872. Nearly his whole life was spent in the latter city, to which his parents removed during his childhood. His collegiate education was received at Yale College, where he graduated in 1823. Having selected medicine as his profession, he received his first instruction in its elements in the office of his kinsman, Dr. Robert Barton, of Winchester, Virginia. He attended medical lectures at the University of Pennsylvania, and the University of Maryland, and received the degree of M.D. from the latter institution in the year 1826. After availing himself for a year or two longer of the facilities for clinical study afforded by the city of Baltimore, he commenced the practice of his profession in Richmond.

He gave an early proof of ardor in the pursuit of professional

knowledge, and of fearless devotion to professional duty, by repairing to New York on the appearance of the cholera in that city in 1832, for the purpose of making in its hospitals a personal study of the dreaded scourge, which he prosecuted for some time with characteristic diligence and zeal. In 1834, impelled by an earnest desire to avail himself of every means of further improvement which lay in his reach, he visited Europe, and spent two years in the enjoyment of the advantages afforded by the schools and hospitals of London and Paris, illustrated at that time by Cooper, Lawrence, Dupuytren, Louis, Chomel, and others of hardly less celebrity. Returning to his field of duty, he continued in the active and successful practice of his profession until within a few months of his decease, commanding the confidence and affection of his patrons by his skill, fidelity, and unaffected sympathy with suffering, and the undivided esteem of his professional brethren and the public at large by his excellent personal and social qualities, and his honorable discharge of all the duties incumbent upon him as a citizen and as a physician. It may be truly said that the voice of censure was never raised against his professional or personal character; and when he passed away, the community, the profession, and the church, of which he was a devoted member, mourned a common loss.

Dr. Haxall was not only a well-informed and skilful practitioner, but contributed on not a few occasions to the literature of his profession. Very early in his career he obtained two Boylston prizes, one for an essay on fistula lachrymalis, the other for an essay on the utility of the external means of exploring the condition of the internal organs. He was also a frequent contributor to the medical journals, especially the *Stethoscope*, a monthly published for a number of years in Richmond.

His interest in all associated efforts for professional advancement was conspicuous. He took the earliest opportunity to unite himself with the Medical Society of Virginia, and continued one of its most active and zealous members until its existence was suspended at the commencement of the war. He was elected President of the Society, in 1841, and again in 1850, and, when it was reorganized in 1870, he was prompt to take part in the work of resuscitation. He may be said to have been one of the founders of the American Medical Association; for, at the National Medical Convention, held in New York, in May, 1846, the meeting of which was the first step towards the formation of our national representative body,

he was present as a delegate from the Medical Society of Virginia, and took a prominent part in its proceedings. He was appointed chairman of the committee on the necessity of a uniform and elevated standard of requirements for the degree of M.D., and, at the meeting held in Philadelphia the following year, presented a report which, while thoroughly imbued with the spirit of reform, was judicious, conservative, and practical—not insisting upon impossibilities, but recommending measures which a serious effort on the part of those interested would have made entirely feasible. He continued to the last to take a lively interest in the affairs of the Association. He was also a member of the Richmond Academy of Medicine from the date of its organization until his death, and was at one time its President. On the occasion of his decease, his late associates in this body, to whose respect and good-will he had commended himself by his refined sense of professional honor and propriety, his high tone of principles and conduct, and his considerate and courteous bearing towards all his professional brethren, gave the most emphatic expression to their high appreciation of his character: and testimony equally honorable was borne by the vestry of St. Paul's Episcopal Church, of which body Dr. Haxall had been for many years a valued member.

DAVID H. TUCKER, son of Judge Henry St. George Tucker, late President of the Supreme Court of Virginia, was born in Winchester, Virginia, on the 18th of June, 1815; he was an alumnus of the University of Virginia, and a graduate of medicine in the medical school of that institution. He subsequently was a student of the University of Pennsylvania, whose degree of M.D. he also obtained in 1837. In 1838 he embarked for Europe, and remained in Paris, diligently applying himself to the study of all branches of his profession, regularly attending the hospitals, and otherwise availing himself of the unequalled facilities in that *then*, as *now*, great centre of medical science. After devoting two years steadfastly in Paris to the perfection of his acquaintance with the noble art he had chosen, and of which he was romantically fond, he returned to the United States, and established himself in a good practice in the city of Philadelphia. A few years after, he married Elizabeth, second daughter of Honorable George Mifflin Dallas, subsequently Vice-President of the United States, and minister plenipotentiary to the Court of St. James.

During his residence in Philadelphia, a charter was granted by

the Pennsylvania Legislature for the establishment of the Franklin Medical College in that city, Dr. Tucker being one of the corporators and promoters of the new enterprise, in conjunction with other distinguished members of the profession. The chair accorded to Dr. Tucker was that of obstetrics (a branch of his profession to which he had devoted peculiar attention in Europe), and this course of lectures gained for him a most valuable reputation, and formed the basis of a work published by him on this subject, and which in some institutions has become a text, as well as a hand-book to the young practitioner.

After a successful practice, and steady maintenance of his growing reputation as a lecturer and practitioner, during nine years in Philadelphia, Dr. Tucker was offered the chair of the Theory and Practice of Medicine in the medical college in Richmond, Virginia, made vacant by the death of his renowned and brilliant predecessor, Dr. John Cullen. Removing to Richmond—his love of his native State of Virginia being an ardent passion with him—he became at once eminent in the practice of the profession, and, it is not too much to say, was ranked among its very first lights.

During the few latter years of Dr. Tucker's life his vision became seriously impaired, superinduced, perhaps, by general ill-health and sad domestic afflictions, and, although partially restored, he never rallied, and on the 17th of March, 1871, he breathed his last, honored and respected by all who knew him.

The following extracts are taken respectively from the Proceedings of the Richmond Academy of Medicine on the occasion of his death, and from a published tribute to his memory, from the pen of one who had known him long and intimately:—

"Dr. Tucker's character, full of strong points, is yet one difficult to depict in few and hasty words. So brilliant in his many gifts, profound in learning, yet practical in his application of knowledge, eloquent in his language, yet simple and forcible in description, he had the qualities which made him eminent as a physician and a teacher. Added to this he was true to his friends, fair and candid to his foes, with a warm heart for those he loved—a heart that never paused to calculate either his own interests or pleasure. To those who knew him ere disease and affliction visited him, these words are but poor justice to his memory."

"But it was in the relation of *friend* that he endeared himself to the many in whose hearts his memory will be kept green and unfading. His was true friendship—not the cold and lifeless

commerce of social civility and compliment, but a strong and active sentiment, in whose expression he found the highest, purest pleasure; a sentiment unselfish, uncalculating, and for which no sacrifice was too great. Not the princely Dane could have worn his chosen and elected friend more loyally in his 'heart of hearts.' Not Nathaniel, divinely distinguished, could have been freer from guile. With him to dissemble was impossible. Even that shading of meaning, those expressions approaching insincerity, which are allowed to soften and smooth the intercourse of the world, were foreign to his manners, giving place to a directness and plainness of expression which some would hold as *brusque* and impolite. But upon a face of much beauty there ever shone the expression of a loving, frank, and candid soul."

UNITED STATES NAVY.

JAMES MONTGOMERY GREENE was born September 24, 1795, near Enniskillen in the county of Fermanagh, Ireland. He received a liberal education. In 1816, in the 21st year of his age, he embarked for the United States with a view to a mercantile career. A fellow-passenger represented to him that his educational qualifications were of a character to enable him to succeed as a classical teacher. Very soon after his arrival in Philadelphia, he established himself as principal of a school to teach Latin and Greek. While thus engaged, he read medicine under the direction of Dr. Stewart. He graduated in the medical department of the University of Pennsylvania in the spring of 1823. His inaugural essay was on cholera infantum. He became one of the resident physicians of the Philadelphia Almshouse. When he left it after nearly twelve months' residence, the Board of Managers, August 31, 1824, adopted resolutions complimenting him on the very satisfactory manner in which he had discharged his duties. He then opened an apothecary shop in the northern part of the city; but sold it at the expiration of a few months.

He was commissioned a surgeon's mate in the navy, April 29, 1825. The title of this grade was changed to assistant-surgeon in 1828.

The period of his naval service exceeds forty-six years. He was employed at sea fourteen years and three months; on shore thirteen years and nine months, and was "waiting orders" or on "leave of absence" eighteen years and two months.

His first sea service, from June, 1825, till May, 1826, was in a flotilla of gunboats stationed off Grande Terre, Barataria. Subsequently he served in the West Indies, on board of the corvette John Adams; in the Mediterranean on board of the Delaware, Concord, Ontario, Brandywine, and Ohio; as surgeon of the fleet of the Home Squadron, on board of the Independence and Potomac; as fleet surgeon of the Pacific Squadron, on board of the Raritan; and of the Paraguay expedition, on board of the Sabine, completing his last cruise in June, 1859.

In 1830 (September 17), he was attached to the Naval Hospital, Philadelphia. Afterwards, in intervals between cruises at sea, he served at the Rendezvous, Naval Asylum, and Navy Yard, Philadelphia, and on board of the receiving ship Pennsylvania at Norfolk. Between the years 1846 and 1868, he was member or president of twenty-three naval medical boards, convened for the examination of candidates for admission and for promotion in the medical corps of the navy.

On the 27th April, 1831, he was promoted to the grade of surgeon, his commission being dated December 4, 1828. He was transferred from the active to the retired list of the navy in 1862.

Such is a summary of his naval career.

He was elected a member of the Franklin Institute for the promotion of the mechanic arts, February 9, 1846; and a Fellow of the College of Physicians of Philadelphia, April 3, 1849. He was a delegate from that body to the American Medical Association in 1858, and also in 1860.

With the exception of a sojourn in the city of St. Louis, Missouri, engaged largely in the private practice of his profession, from August, 1836, till October, 1838, his residence was in Philadelphia when not officially employed elsewhere. In after life he often expressed regret that he had not resigned from the navy and remained in the queen city of the West. But believing that after an indulgence of more than two years' leave of absence, he could not resign consistently with his sense of honor and self-respect, he removed his family to Philadelphia, and proceeded to the Mediterranean on board of the frigate Brandywine, thus sacrificing what he confidently believed an opportunity of a prosperous professional career. He had become popular, made many influential friends, and was seemingly on the high road to fortune.

Dr. Greene married Miss Catherine A. Waltman, of Philadelphia, Oct. 23d, 1827, by whom he had a son, Dr. Francis V. Greene, now

an acting passed assistant-surgeon in the navy, and three daughters. His domestic life was happy in every respect. His widow, son, and two daughters survive him.

The last two years of his life were passed in an invalid condition, frequently in suffering. But he was patient, and often expressed his willingness to close his mortal career whenever it might please God's will. He died June 9, 1871, in the 76th year of his age. His funeral was solemnized at St. John's Roman Catholic church. He was reared in the Roman Catholic faith, and was always a consistent member of the church.

Acknowledging the receipt of the announcement of his death, the Surgeon-General of the navy, Dr. Wm. M. Wood, said:—

"Although having reached that mature age in which death may be daily expected, it is a loss to us to part with one who through a long and useful career has been distinguished by his ability and fidelity as an officer, and by that high-toned chivalry of character which is worthy of imitation."

Dr. Greene was well qualified, by his training and education, to perform well all the duties of his office. Courteous in his manners, conciliatory in his address, kind in his intercourse with his patients, to whom he was unremittingly attentive, and fairly versed in the literature of his profession, he everywhere won the cordial esteem and respect of very many friends, both in and out of the naval service. He was naturally very sensitive, and modest to a fault. Remarkably reticent as to himself, and never boastful in any manner of his actions, he was satisfied to leave to others the discovery of his merits. He was benevolent, liberal in his views, and unobtrusively charitable to the extent of his means. In his home he was pleasantly, simply hospitable. He never manifested love of notoriety or ambition beyond a desire to discharge every duty truly and satisfactorily to all. In this sense, possibly, his love of approbation was in excess. But he scorned pretension.

He aimed at precision and accuracy in all his work, and in every respect was neat and orderly. He was careful of his personal appearance; and in this particular was always as respectful to his family as to strangers or mere acquaintances. Though naturally sensitive, no one of his household ever heard from him a harsh or angry expression. His self-control under provocation was such as to suggest that he was austere; but he was naturally affectionate. He spared neither pains nor expense in the education and culture of his children in various departments of polite learning.

He was a firm and uncompromising supporter of the Union and of the Republican party, though, prior to the breaking out of the rebellion, his political views were those of the Democrats.

In the advancement and improvement of the medical corps of the navy he was earnest, and labored faithfully for its common interests.

He has closed a long and useful career, leaving nothing in it to be remembered with regret. He was in all respects a Christian gentleman, worthy of commemoration and imitation.

PRIZE ESSAY.

WHAT PHYSIOLOGICAL VALUE HAS PHOSPHORUS AS AN ORGANISMAL ELEMENT?

AN ESSAY

TO WHICH WAS AWARDED THE PRIZE OF THE AMERICAN MEDICAL ASSOCIATION FOR THE YEAR 1872.

BY

SAMUEL R. PERCY, M.D.,

PROFESSOR OF MATERIA MEDICA IN THE NEW YORK MEDICAL COLLEGE, PROFESSOR OF MATERIA MEDICA IN THE NEW YORK COLLEGE OF VETERINARY SURGEONS, PHYSICIAN TO MT. SINAI HOSPITAL, ETC. ETC.

RECIPIENT OF THE PRIZE OF THE AMERICAN MEDICAL ASSOCIATION FOR THE YEAR 1863, AND ALSO FOR THE YEARS 1866 AND 1872; RECIPIENT OF THE PRIZE OF THE ALUMNI ASSOCIATION OF THE MEDICAL DEPARTMENT OF COLUMBIA COLLEGE FOR THE YEAR 1866, AND ALSO FOR THE YEARS 1867 AND 1868.

PREFACE.

SOME six years ago, while sailing from Bridgeport to New York, a strange gentleman, who was seated near me, lent me a pamphlet written by Professor Wilson. Making that my text, and carrying out the current of thoughts and ideas suggested by it, with the deeper research and experiments I felt compelled to undertake, I have written the present essay.

It has often been suggested by medical men and others, that physiological chemistry in all its relations should be made as interesting a subject to the student, or general reader, as history. In these pages I have tried to meet this desire. The text will be found as free as possible from the purely technical, while in the appended notes the chemistry proper and its nomenclature are entered for those who desire to refer to them.

INTRODUCTION.

THE investigations of chemists have taught that living organisms are not accidental congregations of atoms, or different kinds of elements thrown promiscuously together in indefinite quantities. Chemistry has taught that each animal or plant, each separate organism, is definite and permanent in its chemical composition; but that individual parts differ, each organ having its own composition, which differs sometimes slightly, sometimes very materially from other organs in close proximity to it; thus, a bone differs very materially in its chemical composition from the periosteum surrounding it, and bone and periosteum both differ from the muscle attached to them. Each distinct genus of animals, or plants, has passed through the unnumbered centuries since creation with the same structural development, and the same chemical formula of embodiment. Within very narrow bounds, this is constant with each species; and individuals of the same species are chemically, as well as anatomically, alike. There are certain chemical elements that are necessary to an organ, they are invariably present in it, and they are also invariably present in the same organ of every individual of the species.

Of the numerous elements that are offered to it, every organism has the power of selecting the chemical elements that are needed for its composition and structural development; also in an equal degree the power of rejecting such elements as are not needed, or are in too large quantities for its use. Plants, for example, readily absorb and appropriate all the potassa or soda they can find in the soil in which they grow; but they reject the alumina. Animals readily absorb and appropriate all the phosphate of lime they find in the vegetable food they eat; but, with a very trifling exception, they reject the silica that the plants offer in large quantities.

Elements that are presented in the greatest abundance are not necessarily absorbed in proportion to their abundance, but are

frequently wholly rejected for those elements which exist in very minute quantities. The tusk of the elephant, for instance, is composed principally of phosphate of lime, which existed in very minute quantities in the vegetable food eaten by the animals, while the silex existed in the food in very large quantities. Here we see the power of selection and rejection; the minute quantity of phosphate of lime is all absorbed, while the tons upon tons of silex, with which it was associated, are all rejected.

Different species of plants growing side by side in the same soil, or different genera of animals feeding upon the same food, do not necessarily appropriate the same chemical elements; in fact we see that, though certain elements are common to all, each genus has the power of selecting, from those substances offered in common, such as is suited for its own peculiar organism. From the same sea-water, soda and iodine are absorbed by the sea-weeds, silica by the sponge, carbonate of lime by the coral insect, and phosphate of lime by the fish.

With but the differences that may occur from accident or design, we find that every element discovered in either animal or vegetable must be regarded as indispensable to it, but the importance of an element thus existing must not be judged of in ratio to the quantity present; for the iron or albumen in the blood, though small in quantity, is as indispensable to the characteristics of that fluid as is the water which comprises the largest portion of it.

It might seem to those who do not study, that the bodies of men and animals, when once perfect, should remain in this perfect condition, and be composed to-day of the identical elements of which they were composed years ago. But we find the body is continually changing, and that at no moment does it contain all the identical elemental atoms that it contained previously. A change is perpetually going on; the old and used particles are removed from the system, and their place is supplied with the same elemental substance newly presented to the organism. Man is never a fixity, for he is perpetually renewed; and yet he retains identically the same chemical composition.

The blood which is perpetually circulating through the system, is, by the power of selection and rejection before spoken of, composed of elements selected from the food we eat. The blood contains all that is necessary to keep the body in a state of constant renovation. In the arterial system and its capillaries, after absorbing oxygen from the lungs, it supplies to every organ the

element that it needs; each organ requiring its own element, which differs from that required by other organs. In the venous system it abstracts all that has been used and is needless, and passes it out of the body. Motion destroys a portion of the integrity of a muscle; sight a something from the retina of the eye; hearing a moiety from the sensibility of the auditory nerve; and "thoughts which breathe and words which burn" literally burn up, and change into another chemical formula, a certain portion of the *phosphorus* of the brain.

The unprecedented progress of chemistry and physiology, and that deepest of all sciences physiological-chemistry, has emboldened me to ask what few men would have had the temerity to ask even twenty years ago. My readers must consider that, in asking this question, I do not profess to answer it, either to their satisfaction or my own; but I hope thereby to call the attention of earnest and able physiological chemists to a series of important subjects. I regret to say that I can quote but few authorities on the subject I am about to propound.

PRIZE ESSAY.

WHAT PHYSIOLOGICAL VALUE HAS PHOSPHORUS AS AN ORGANISMAL ELEMENT?

THE physiological, pathological, and chemical investigations I have made have demonstrated to me that phosphorus universally exists in the animal economy; that it exists to a larger or smaller amount in every organ; that it exists in different modifications in one organ from those in which it exists in another; that its non-existence in an organ destroys, or suspends, the function of that organ; that its renewal restores lost functions; that it changes its chemical formula in every cerebral or nervous action;[1] that nutrition, absorption, secretion, and reproduction depend more or less upon the presence of phosphorus in one or other of its multitudinous modifications; that it exists in one form in the soft cerebral substance and pulpy nerves, in another in the hardened bone; that it is present in some concrete formula in the muscle, and in some fluid state in the juices in which the muscle is bathed; that it exists in some peculiarly nutrient but mild form in the milk, and in the procreative fluid.

It does not exist in the various organs in an uncombined state, neither is it found as phosphorus; but in different organs it is found in different combinations; in nearly all it is associated with oxygen either as phosphorous or phosphoric acid; in some it is united with water as a base; in others with water and mineral substances; and again it is associated with fatty bodies, with organic bases, and with alkalies.

Phosphorus is one of the most important, it certainly is the most interesting, of all the elementary substances. The best chemists of

[1] "Without Phosphorus there is no thought."—LIEBIG.'
"Without Phosphoric acid there is no life."—HORSFORD.

all countries have endeavored to explain the peculiar anomalies of this element, and they have endeavored to systematize its actions by the same laws which are applicable to other elements, but as yet its study is an enigma. The facts that have been collected by Graham of its multitudinous phenomena are too complicated, and no laws yet known are sufficient to explain or arrange them. In the efforts I have made in this direction I have had no assistance, for little has been learned since Graham wrote, about thirty years ago.[1]

Of all the elementary bodies, there is none that can assume so variable a form. Phosphorus, as we are acquainted with it, is in the form of solid, flexible, wax-like sticks, which, when cut with a knife, present a clear, yellowish, semi-transparent appearance. It fumes when exposed a short time to the air, exhaling a garlicky odor and giving a luminous appearance. If in the dark, this luminosity is observed below the freezing point of water. It can be preserved, with safety, only under water; and if taken out of water and exposed in the air to a temperature of 108° Fahr., it bursts into flame with a dense white smoke, and a white substance deposits, which is simply phosphorus united with oxygen, or phosphoric acid. If a portion ignites upon the skin it causes dangerous and painful burns. This vitreous phosphorus is highly poisonous.

Phosphorus in this vitreous state, then, we find a soft, wax-like, semi-transparent substance, luminous in the dark, readily bursting into flame at a low temperature and changing into an oxide; incapable of being preserved in its natural form, except it is kept under water, highly poisonous, and susceptible of combining readily with other elements, which it compels to form a base for its use.

But phosphorus is possessed of great variability of form, without being changed in its chemical composition. By mere exposure to the rays of the sun in a vacuum, or by exposure to heat in a vacuum, or in a gas devoid of oxygen, this vitreous, almost color-

[1] This non-metallic element phosphorus was discovered in 1669 by Brandt, an alchemist in Hamburg. It was obtained by him from putrid urine, and its process of extraction remained a secret until 1737, when the process was purchased and rendered public by the French government. In 1769, Gahn, a Swedish chemist, discovered the presence of phosphoric acid in bones. Scheele devised a process for procuring phosphorus from bones, and this process, with a few improvements, is the one now in operation. The present sources of phosphorus are the bones of cattle from South America, where bones are used as fuel. It is obtained also from bone-black or animal charcoal after it has been used by the sugar refineries, and from calcareous deposits of phosphate of lime.

less, phosphorus, is changed into a red amorphous solid. The two substances have no seeming resemblance.[1]

Vitreous phosphorus, by being subjected to a heat nearly sufficient to boil it, and then being allowed to cool suddenly, much resembles, in consistency and tenacity, the substance called "viscid sulphur:" this doughy viscidity it retains for a considerable time; but after a while returns to its original state.

By a greater degree of heat, sufficient to fuse it, and then by allowing it to cool suddenly, it is converted into a black opaque substance.[2]

By a less degree of heat, and exposure under water to light, a white opaque body is formed, which does not fuse at the same temperature, or with the same ease as the vitreous variety.[3]

By slight alterations in the method of preparation,[4] it may become crystalline instead of vitreous.

[1] Professor Schrötter discovered this red amorphous phosphorus in 1848; it is made in the following manner: the vitreous phosphorus in its purified state is placed under water, in a cast-iron boiler, over a furnace; then melted, cooled, and water removed from its surface. The vessel is then immediately and securely closed, air-tight (except a small iron tube for the escape of vapor), by a cast-iron cover. Heat is now gradually applied, by means of a furnace, until the phosphorus is at 450° F., and that temperature is maintained for a greater or less period of time, according to the amount of phosphorus acted upon, and the mass is then allowed to cool. A quantity of two hundred pounds is kept heated for three or four weeks. After this process the vessel is opened, and the phosphorus, which has now become a hard, red, brick-like substance, is covered with water and extracted by means of iron bars. These stony fragments are broken into small pieces, under water, and ground under water to a fine powder. It is then purified from the small amount of vitreous phosphorus contained in it.

The minutest quantity of vitreous phosphorus, in this red amorphous variety, can be detected by digesting the latter in the state of powder in bisulphide of carbon, and then letting fall a single drop of the clear liquid upon a saucer, floating upon boiling water in a dark place; luminosity will immediately appear if vitreous phosphorus is present. That is the vitreous variety which is soluble in bisulphide of carbon; the red variety is insoluble.—*Chem. News*, vol. iv. p. 46.

[2] Dr. Blondlot shows how vitreous phosphorus can be converted into the black variety at will. He distils phosphorus that has been exposed to the sun, and collects it in a flask which is slowly cooled in a water-bath, and he finds that it becomes a white mass at about 44° C., but at 45° or 46° C. it suddenly turns to a beautiful black color. Once obtained, this black phosphorus can be redistilled and fused; it is colorless while liquid, but again becomes black on cooling and solidifying.

[3] Researches on the Nature of White Phosphorus.—M. Baudrimont, *Acad. Sciences*, Nov. 13, 1865.

[4] Blondlot sublimed phosphorus in an atmosphere of nitrogen, and obtained beautiful crystals belonging to the cuboidal system. While preserved from the

By melting in viscid fluids it may be reduced to a fine powder retaining all the properties of the original phosphorus.[1]

We have, then, the same phosphorus, possessing the same chemical constitution in seven different forms or modifications. We find that the same substance is thus possessed of great stability, is impermanent yet variable in form, and very mutable under certain trifling conditions. The ever-varying, the ever-renewed condition of the human system, to which we before alluded, is thus provided with an element that fulfils all its requirements; stable when stability is requisite, mutable when changes are demanded.

We find the same chemical element, phosphorus, then, in seven different forms:—

1. A glass-like waxy substance.
2. A red amorphous body.
3. A white amorphous body.
4. A black amorphous body.
5. A viscid, dough-like substance.
6. A crystalline body.
7. A pulverulent body.

The red amorphous variety is better understood and more used than the other forms. It differs very remarkably from ordinary phosphorus in its physical properties. It is well known in modern chemistry that a substance may exist in two or more physical states, possessing very different physical and chemical properties; and that there may be as great a difference in the properties of the same substances, in its different states of aggregation, as there is between two chemically different substances. For instance, there is as great an amount of physical difference between carbon, as it exists in the diamond, and as it exists in pure lampblack, as between copper and iron, silver and gold. The two kinds of phosphorus we have described are, then, precisely the same chemical substance, but in different states of aggregation. They can be changed at will from one to the other, without making any additions or subtractions, heat alone being the agent of conversion. The

light they remained bright and colorless; but in light, even diffused light, they soon became red, without, however, altering their form.

[1] "Blondlot has found that phosphorus may be reduced to a very fine powder by melting it in a hot concentrated solution of any neutral salt or even in syrup, and shaking it continually until cold. It has long been known that phosphorus was brought to a finer powder in urine than in water, and that effect was ascribed to the presence of urea; but this is in consequence of the density of the fluid."

following is a comparison of their properties. I have for convenience arranged them in tabular form, and will term them white and red phosphorus:—

WHITE.	RED.
Poisonous.	Innocuous.
Evolves a strong odor.	Nearly odorless.
Phosphorescent, luminous in the dark.	Not phosphorescent, perfectly illuminous.
Melts at 108° F.	Melts at about 500° F.
Very transparent.	Opaque.
Almost colorless.	Varies in color from reddish-black, with metallic lustre, to iron-gray, brick-red, crimson, and scarlet.
Freely soluble in various liquids.	Nearly insoluble in all liquids.
Distinctly crystalline.	Amorphous, destitute of all crystalline structure.
Soft, may be indented by the nail.	Hard as common red brick.
Flexible as copper or lead.	Brittle as glass.
Oxidizes in the air at ordinary temperatures.	Is unalterable in the air.
Unites readily with other elements.	Is acted on by other elements with great difficulty.

When the red amorphous variety is heated to the boiling point, in a gas which has no action on it, it is again restored to its ordinary character of vitreous phosphorus.

I hope to prove hereafter that every movement, every thought, every sensation, burns, or converts into another formula, an atom of phosphorus that is within the system. In the act of conversion it seizes upon more or less oxygen, becomes inactive in its condition, unites with other oxidized elements which it forms into bases for its accompaniment, and is eliminated to give place to other active molecules.

Phosphorus seizes upon oxygen with great avidity. It has also the power of converting the oxygen, with which it comes in contact, into that peculiarly active, energetic modification known as ozone; or oxygen with a greatly exalted and active oxidizing power.[1] There is no reason to doubt that it has the same power of multiplying the activity of the oxygen within the system, and thus becoming not only itself an exalter of energy and force, but also communicating activity to fellow elements.

The oxides of phosphorus are no less peculiar than phosphorus

[1] Amer. Journ. Pharm., 1863, p. 142, and Amer. Journ. Sciences and Arts, Nov. 1862.

itself.[1] We have before stated that phosphorus undergoes oxidation in the open air, and diffuses white vapors; at the same time the phosphorus becomes covered with acid drops which arise from the phosphorous acid[2] produced in these circumstances, attracting the humidity of the air. This slow combustion is attended with evolution of heat, and may terminate by the phosphorus bursting into flames. This low combustion is observed even at freezing point, and increases perceptibly with increase of temperature. But the presence of certain gaseous substances, even in exceedingly minute quantities, has a remarkable effect in preventing this slow combustion of phosphorus; thus at 66° Fahr. it is entirely prevented by the presence of

1 volume of	vapor of	sulphuric ether in	150	volumes of	air.
"	"	naphtha in	1450	"	"
"	"	olefiant gas	450	"	"
"	"	oil of turpentine	4444	"	"[3]

and the influence of these gases or vapors is not confined to low temperature, a certain admixture of them defending phosphorus from oxidation even at 200° Fahr. But on allowing such a gaseous mixture to expand by diminishing the pressure upon it to a half, or a tenth, the phosphorus becomes luminous, and the proportion of foreign gas required to prevent the slow combustion must be

[1] Phosphorus is susceptible of four different degrees of oxidation, the highest of which is a powerful acid, while the acid character is not absent even in the lowest. These compounds are—

Oxide of phosphorus	$2P+O$,
Hypophosphorous acid	$P+O$,
Phosphorous acid	$P+O_3$,
Phosphoric acid	$P+O_5$.

Oxide of phosphorus is a powder of a canary-yellow color, denser than water, and insoluble in water, alcohol, and ether. It may be kept in dry air without change. It resists a temperature of 570° F. without change, but assumes a lively red color; it does not take fire in the air until heated a little above the boiling point of mercury. This oxide absorbs dry ammoniacal gas, and appears to form feeble combinations with the fixed alkalies. Leverrier assigns to its hydrate the composition $2P_2O+2HO$, and to its phosphate $2P_2O+3PO_5$.

Hypophosphorous acid is colorless, viscid, and sour to the taste. The anhydrous acid PO has never been obtained, three equivalents of water being essential to its composition, namely, one equivalent as a base, and two equivalents which appear to form elements of the acid itself; the formula is $HOPO+2HO$.

[2] PO_3+HO.

[3] See Graham's Elements of Inorganic Chemistry, or Quarterly Journal of Sciences, vol. vi. p. 83.

greatly increased. The only explanation we can give of this peculiarity is that the gases, which exert this influence, have an attraction for oxygen, and are themselves undergoing a slow oxidation.

It is stated that the phosphorus that is present in living organisms is always in the form of phosphoric acid; that is phosphorus united with its maximum of oxygen.[1] By the methods of analysis ordinarily used, it could hardly be recognized in any other form, but by studying its peculiar modifications, we find that it exists in the venous blood, and some of the structures as phosphorous acid,[2] and even as hypophosphorous acid.[3] By this assertion it is not meant, however, that these acids exist *per se* in their uncombined form, but that they exist in combination with some one or other base. But from the great peculiarities of phosphoric acid, an acid differing so greatly from any other, it would be possible for it to be present as an organismal element without injury to the living organism. Phosphoric acid possesses many properties in common with other acids. Like the mineral acids, sulphuric, nitric, and hydrochloric—or the vegetable acid, acetic—it is extremely sour, dissolves readily in water; it converts the vegetable blues to red, and saturates and unites with bases. It possesses these properties in common with all other acids, but differs from them all, having several other properties peculiar to itself. A drop of either of the other acids when in a state of purity, or even when largely diluted with water when placed upon the skin, causes intense pain, and if allowed to remain, produces violent inflammation or even disorganization. But phosphoric acid, even when in its strongest liquid condition, may be placed upon the skin and retained there for some time without causing pain or producing the slightest injury. A portion of muscle placed in any of the other acids would be charred and decomposed, but it might remain in phosphoric acid without any such effect. Phosphoric acid is neither corrosive nor destructive to the tissues.

We have given the chemical composition of phosphorous and phosphoric acid; we need but repeat that phosphoric acid is but the ordinary vitreous phosphorus united with five equivalents of oxygen. The peculiar mutability of form of phosphoric acid is more remarkable even than the mutability of phosphorus, of which

[1] PO_5. [2] PO_3. [3] PO.

we have spoken. When phosphorus is burned in dry air, or dry oxygen gas, the white dense smoke that arises from it soon condenses into a white, opaque, soft solid, which resembles dry snow in appearance. This is called anhydrous phosphoric acid (without any water present in its composition). Anhydrous phosphoric acid dissolves in water; but so peculiar is its association with water that it needs particular mention.

The mineral acids, of which we have spoken, unite with water as one equivalent, or chemical unit of acid, united with one unit of water; whether a larger or smaller quantity of water is presented to this unit of acid, it unites with this unit of water, neither more nor less, and this unit of water becomes a part of its composition. It is most intensely acid in this condition, but if the acid were united with three or more units of water it would be less acid, and in this condition each unit would saturate a smaller quantity of base. Each unit of phosphoric acid has the peculiar property of uniting with one, two, or three units of water,[1] and is most acid when united with the largest quantity of water. This unit of acid, united with three units of water, dissolves in water to any extent, but retains the special unity with three units of water, never mind how large or how small a quantity of water it may be dissolved in. It must be understood that this unity with water as a part of its chemical composition, and solution in water, do not mean the same thing.

When anhydrous phosphoric acid is thrown into water, each unit of acid unites with three units of water, or rather it seems to become a phosphate of water. In this state its neutralizing power, instead of being unit of acid to unit of base, as with the mineral acids, is unit of acid to three units of base; and it is characterized by this strange peculiarity in its chemical combination with all bases. As found in the bones, it is united with three units of lime, and is known as the tri-basic phosphate of lime.[2]

Under certain chemical manipulations, and under certain vital processes, this tribasic phosphate of water possesses the property of dropping or leaving off one of these three units of base, and thus losing its triple power of saturation, for a twofold power only; this is known as a bibasic phosphate, and is as stable in all its compounds as its more powerful acid; and unless by certain chemical

[1] $HO+PO_5$, $2HO+PO_5$, $3HO+PO_5$. [2] $3CaO+PO_5$.

procedures, although dissolved in water, it does not again absorb the lost unit of water, or regain its lost power of saturation.[1]

[1] "Phosphoric acid forms three different and independent classes of salts, containing respectively one, two, or three equivalents of base. On the binary theory these three classes of salts must contain three different salt radicles; combined respectively with one, two, or three equivalents of hydrogen or metal. The three phosphates of water and the corresponding phosphionides of hydrogen would be represented as follows:—

1	2	3
$HO+PO_5$,	$2HO+PO_5$,	$3HO+PO_5$.
$H+PO_6$,	$2H+PO_7$,	$3H+PO_8$.

"Such salt radicles and such compounds with hydrogen startle us from their novelty; but it may be questioned whether they are really more singular than the anormal classes of phosphates containing several equivalents of base for which they are substituted, but which we have been more accustomed to contemplate.

"Phosphoric acid, PO_5, may be considered, from its properties and mode of formation, as phosphorous acid, PO_3+ two equivalents of oxygen less strongly combined; and in the same way arsenic acid, AsO_5, as arsenious acid, AsO_3+, two equivalents of oxygen. Now, when united with a base, which we may suppose a metallic protoxide, RO, these two surplus equivalents of oxygen in the phosphoric acid, added to the single equivalent of oxygen in the base, convert an equivalent of the latter into an acid of the formula RO_3. Two more equivalents of base are required, one to neutralize this RO_3, and the other to neutralize the phosphorous acid PO_3, making three equivalents of base to every single equivalent of phosphoric acid.

"The general formula for tribasic phosphate is, therefore,

$$\text{Phosphate } \frac{O \quad O_3}{R \quad R} + \frac{O \quad O_3}{R \quad P}$$

and resembles a double sulphate, RO, SO_3+RO, SO_3. Tribasic subphosphate of lime ($3CaO,PO_5$), $\frac{O \quad O_3}{Ca \quad Ca} + \frac{O \quad O_3}{Ca \quad P}$.

"Phosphoric acid appears further to have the power, when heated strongly, of assuming the two equivalents of oxygen into a more intimate state of combination, possibly with a loss of a portion of combined heat, and gives the class of monobasic metaphosphates. The general formula of a metaphosphate is $\frac{O \quad O_5}{R \quad P}$.

"A pyrophosphate (bibasic phosphate) is on this view a compound of a common phosphate (tribasic) and a metaphosphate.

$$\text{Pyrophosphate } \frac{O \quad O_3}{R \quad R}, \frac{O \quad O_3}{R \quad P} + \frac{O \quad O_3}{R \quad P}.$$

Hence the equivalent of a pyrophosphate contains four equivalents of base and two of phosphoric acid, the reason why so many double biphosphates exist.

"Phosphoric acid is thus supposed to resemble those conjugate organic acids which combine with two equivalents of base, because they possess the elements of two different acids.

"The investigations of Fledmann and Hammeberg establish the existence of

Again, under chemical manipulations, or, as the old alchemists used to call these processes, "torturings," either the tribasic or bibasic phosphate has the power of parting with its water, and forming a compound with one unit of water only; so that it becomes, like the mineral acids, unit of acid to unit of water, and has the power of neutralizing only one unit of base; in this state it is a monobasic phosphate.

In its behavior then with water, we find that phosphoric acid presents strange peculiarities. We have first the white, opaque, snow-like anhydrous phosphoric acid; that is phosphoric acid without any water in its composition. Simply by putting this substance into water, it unites with three equivalents, and by chemical manipulation can readily be transformed into a substance holding either two or one unit of water as a base. Possessing this variable constitution, we see then that as an organismal element each unit has the power of either one, two, or three units of any other acid; and that it may readily be converted into one or other of these variable conditions.

We have before spoken of the tribasic phosphoric acid being perfectly innocuous if placed upon the tenderest skin. The bibasic and monobasic varieties are equally devoid of corrosiveness or causticity; and the anhydrous phosphoric acid may be kept in contact with the skin without acting as a caustic or doing injury; any of the mineral acids in like circumstances would destroy all the tissues with which they came in contact.

Phosphoric acid possesses another peculiarity. There is a substance in nearly all the tissues of the body resembling much in its chemical reactions the substance familiar to us as the white of eggs. This is called albumen. It exists in nearly all the fluids of the body; in the nerves, in the brain, in the flesh, etc., whether it is presented as the white of eggs, or as the fluids of the body; all the mineral acids before spoken of have the power of coagulating it. They act upon it in the same way as if the fluid had been boiled. Neither the tribasic nor bibasic phosphoric acid coagulates albumen; but the monobasic variety has the power to do so. Thus the tribasic and bibasic varieties, which so peculiarly differ from other acids, still retain their peculiarity in contact with albumen; whereas the monobasic, which, like other acids, is

two new classes of phosphates, intermediate between the monobasic and bibasic classes, having the formula $6MO,4PO_5$, $6MO5PO_5$.

"Metaphosphoric acid also is susceptible of five polymeric modifications."

unit of acid to unit of base, has a similar property with them in coagulating albumen. We see in this peculiarity the great fitness of phosphoric acid as an organismal element; for if, under all its phases, it coagulated albumen with which it came in contact, it could not exist so largely in the brain, the nerves, the muscles, or the procreative fluid.

Phosphoric acid possesses still another peculiarity. Sulphuric, nitric, hydrochloric, hydrofluoric, and other strong acids are caustic or corrosive in their action because of their intense affinity for water. They seize from the animal tissues their natural moisture, and thus destroy them. But all these acids yield up their unit of water to anhydrous phosphoric acid, and themselves become anhydrous.[1] The phosphoric acid, which is not caustic to the tenderest skin, robs these most caustic acids of their combining unit of water. In its chemical action upon other acids, it is the most powerful and dominant of all substances; in its effects in the human economy it is as bland as oil. It is everywhere found in the animal tissues —non-irritant, innocuous, and nutritious.

Again, let me advert to another peculiarity of phosphoric acid. The tribasic phosphoric acid, of which we have hitherto spoken, is in reality nothing but a tribasic phosphate of water,[2] the water in this connection answering as a base to the acid. But this phosphoric acid has the power of dropping either one, two, or three units of this basic water, and uniting with either one, two, or three units of some other base. In the ordinary phosphate of lime found in the bones, we find one unit of phosphoric acid combined with three units of lime.[3] In the phosphate of soda found in the blood, we have one unit of phosphoric acid united with one unit of water and two units of soda.[4] In the phosphate of potassa found in the muscles, we have one unit of phosphoric acid united with two units of water and one unit of potassa.[5] It is not necessary either, when it parts with water as its base, that it should unite with one base only, for we find it forms several double compounds,

[1] The affinity of PO_5 for water is very intense, the anhydrous phosphoric acid taking water even from sulphuric acid, and eliminating anhydrous sulphuric acid. As HO,PO_5 cannot be made PO_5 by heat, the proportion of dry acid in a solution of the free acid is determined by adding a known weight of oxide of lead, evaporating to dryness, and heating the residue, as in the case of SO_3. The phosphate of lead formed being anhydrous, the increase of weight which the oxide of lead sustains represents exactly the weight of dry phosphoric acid.

[2] $3HO+PO_5$.

[3] $3CaO+PO_5$.

[4] $HO,2NaO+PO_5$.

[5] $2HO,KO+PO_5$.

such, for instance, as one unit of acid, one of water, one of soda, and one of ammonia, all united as a tribasic phosphate.[1] Again, we find it as one unit of acid and one unit each of water, magnesia, and ammonia, as in urinary calculi. In many of the seeds of the cereals, we find it as one unit of acid, two of magnesia, and one of ammonia.

Again, by using different chemical varieties of a base, it combines in different proportions with phosphoric acid. Thus, in making phosphate of soda, if caustic soda is used, we have a phosphate containing three units of soda and one of acid;[2] if carbonate of soda is used, we have a salt containing two units of soda, one of water, and one of acid;[3] and if muriate of soda is used, we have a salt containing one unit of soda, one of acid, and two units of water.[4]

Again, the tribasic phosphoric acid, in parting with one of its units of water, becomes bibasic; in this condition it is not essential that these two bases should be of water, or of the same base; it may consist of one unit of acid, one of water, and one of soda; or it may be one unit each of acid, soda, and magnesia, or one of acid and two units of the same base. We thus see that either of these classes of phosphoric acid has the power of changing its base with the greatest facility. In this we again see the great mobility and organismal value of phosphorus and its compounds.

We have before spoken of the power of the tribasic phosphate to drop one of its units of base and become bibasic, or to drop two of its units and become monobasic. We now have to advert to the strange peculiarity of the monobasic phosphate to again form bibasic and tribasic compounds.[5] "That is, phosphoric acid has

[1] HO,NaO,NH_4O+PO_5.

[2] $3NaO+PO_5$.

[3] $2NaO,HO+PO_5$.

[4] $NaO,2HO+PO_5$.

[5] "The bibasic and monobasic phosphates, heated with water in sealed tubes to 535° F., are decomposed with the formation of tribasic phosphates. If the base of the pyrophosphate forms an insoluble tribasic phosphate, the latter is precipitated, and an acid phosphate remains in solution. Thus, with pyrophosphate of silver, $2(2AgO,PO_5)+2HO=3AgO,PO_5+(AgO,2HO)PO_5$.

"If the base of the pyrophosphate forms a soluble tribasic phosphate, the product is a neutral tribasic phosphate, thus, $2KO,PO_5+HO=(2KO,HO)PO_5$.

"The metaphosphates, similarly treated, yield insoluble phosphates and free phosphoric acid, which dissolves small quantities of the precipitated phosphates; thus, with lime, $3(CaO,PO_5)+6HO=3CaO,PO_5+2(3HO,PO_5)$.

"The metaphosphates of potassa and soda yield acid phosphates $NaO,PO_5+2HO=NaO,2HO,PO_5$."

For a very interesting paper on phosphoric acid, read Amer. Journ. Pharm., 1861, p. 385.

the power of making itself descend in the scale from giant to dwarf, and also possesses the power of ascending again from dwarf to giant." We have shown how, by the effect of heat only, the tribasic phosphate of soda becomes converted into the bibasic; and by continuing the heat, the bibasic becomes monobasic. Now this monobasic phosphate of soda is susceptible of as remarkable a conversion, simply by the agency of heat, and shows a change in its nature without any change in its composition. This salt and other phosphates of the same class also combine with water, which becomes attached to it as simple water of crystallization; that is, it cannot assume the crystalline form without imprisoning this quantity of water.[1] This monobasic phosphate of soda, so mingled with water, when dried at 212° F., retains one unit of water; but that water is not basic; it is no part of itself; it is but a garment with which it is always dressed. For if the salt is again dissolved in any quantity of water, it is still found to be monobasic. If this crystallized monobasic phosphate of soda be heated to 300° F., it changes completely, without losing anything, and becomes bibasic; the water that was water of crystallization before, becomes basic, that is, a part of its composition. Thus we have, in the first instance, one unit of acid and one of soda; in the second, one unit each of acid, soda, and water. It must be remembered that in all these instances the units of water are as much a base to the acid as soda, potassa, or other bases; in fact, as we have before said, a phosphate of water.

The salts of phosphoric acid have also as strange peculiarities as phosphoric acid or as phosphorus itself.[2] Thus, the phosphates of one class have the power of uniting with the phosphates of another class as salts—one class of salts thus acting as an acid, the other as base. Thus the power of variability is without limit,

[1] The formula of the salt in its two states can be here plainly understood.

a. Hydrated metaphosphate of soda NaO,PO_5+HO.
b. Pyrophosphate of water and soda NaO,HO,PO_5.

[2] "The triple phosphate of lime, known as bone phosphate or mineral apatite, is at once attacked by aqueous sulphurous acid, and the concentrated solution at 60° F. is decomposed into three different salts—the mono- and bi-basic phosphate of lime and sulphite of lime—and if these salts be evaporated in rarefied air with alcohol, a series of interesting salts are produced. If these solutions be rapidly heated to boiling, under the ordinary pressure, a new crystalline salt, a double phosphate and sulphite of lime, is produced."—*Journ. Applied Chemistry*, Dec. 1871.

and the number of possible combinations beyond calculation. What better substance than phosphorus could we have as an organismal element?

Hypophosphorous acid, as we have before shown, is a compound of one equivalent of phosphorus united to one equivalent of oxygen.[1] It is never found as an anhydrous acid, but three equivalents of water are required to form the liquid acid, and two of these equivalents of water are inseparable, and enter into the composition of all its salts.[2] The other equivalent of water may be replaced by other bases.[3] The salts are permanent in the air, but readily absorb oxygen when in solution, and become converted into phosphates; they are also oxidized in the animal economy.[4]

Again, phosphorus possesses peculiarities more remarkable than any we have before mentioned. After a long series of experiments, I find it has peculiar properties of uniting with fatty bodies, and organizing them into a base in the same manner as it makes a base of water or of alkaline substances. I have also succeeded in forming compound fatty hypophosphites and phosphates. Phosphorus dissolves, to a certain extent, in the animal and vegetable oils, being more soluble in some oils than in others. In its solution in oils, as made in the laboratory, it remains for some time a simple solution of vitreous phosphorus. It has not entered into combination or changed its characteristics, either chemically, or as a therapeutic agent. Certain chemical manipulations, however, change its composition, and entirely alter its therapeutic action. By chemical manipulations, described hereafter, I have succeeded in converting phosphorous into anhydrous hypophosphoric acid, and so retaining it in this *nascent* condition until it combines with three equivalents of olein, forming a tribasic hypophosphite of olein, two equivalents of which are permanently united with the acid; the other equivalent may be exchanged for

[1] PO. [2] HO,2HO,PO.

[3] For an interesting paper read Amer. Journ. Pharm., vol. xxx. p. 118.

[4] "Rammelsberg has investigated the compounds formed by PO with bases with special reference to their water of combination and of crystallization. The salts of Zn, Co, Mn, Cd, Pb, Cu, Fe_2O_3, and of the alkalies, contain one equivalent of water chemically combined, while those of Ba, Sr, Ca, Mg, and Ni contain two equivalents. The water thus combined cannot again be eliminated as such, as by high temperatures the salts are decomposed without liberation of water. The amount of water of crystallization contained in these salts is likewise given."—*Ch. C. B.*, July 3, 1867.

another base.[1] If, instead of olein, the more solid animal fats are substituted, margarin or stearine becomes its base; or it may be tribasic, consisting of two units of olein and one of stearine, or two of margarin and one of olein; or two units of olein and one of glycerine, as we find it already formed in some of the animal tissues. With these forms, I have, for some years, been experimenting as to its physiological action and therapeutic effects, and I find it differs from all other preparations of phosphorous and phosphoric acid. Into a detailed description of these experiments I will enter in the proper place.

And yet again: Phosphorus assumes other modifications, and performs other functions besides those we have hitherto spoken of. Although we have noticed the multitudinous modifications which phosphorus assumes in a chemical condition, we have as yet avoided speaking of phosphorus as a component part of the animal economy, although every possible modification which we have described undoubtedly exists as part of some one of each of the various tissues of the body. We have now, at some length, to speak of phosphorus as an organismal element, in combination with living, active, organic bases, forming part, and being part, of every texture of the body. We find it in the brain and nerves, not only as an oleo-phosphate, but as a protagon[2] in combination with nitrogenized tissues, as well as with carbon, hydrogen, and oxygen. (Just such compounds formed by nature in the system as we have described on the last page, and have endeavored to imitate in the laboratory.) I have found it in the spermatic fluid, in active combination with that highly nitrogenized body, protalbumen; in the milk in combination with albumen and casein, and also as an oleo-phosphate in the cream. I have found it in the muscular fibre in combination with the nitrogenized body fibrine; and in the fluids which bathe the muscles in combination with nitrogen, hydrogen, carbon, and potassa. I find it in the

[1] In the union with all of these oleaginous substances glycerine eventually becomes the base, but the appearance and chemical reactions differ with the kinds of fat used.

[2] "There exists in the brain and nerves a substance discovered by Dr. Oscar Liebriech, and named by him *protagon* ($C_{118}H_{24}NO_2$). It gives rise to neurin ($C_5H_{13}N$), glycerine, phosphoric acid, and a fatty acid, when treated with an alkali; and this substance, of which $\frac{1}{10000}$th forms a strong jelly with water, may be acted on by the alkaloid, and thus form a nerve substance having very different physical and chemical properties from the protagon in its unaltered state."—*Lectures on the Application of Chemistry to Pathology and Therapeutics:* H. Bence Jones, M.D.

serous tissues in combination with nitrogen, hydrogen, carbon, and lime; and in the blood as a highly organized oleo-hypophosphite, having one of its bases an active nitrogenous element. Thus, we see that within the body phosphorus becomes an alkaloid substance,[1] having a nitrogenous base; in this form it is more highly organized, and performs functions of a higher development.

At this stage of our inquiry an important question suggests itself; how, and in what form, does phosphorus, or the phosphates, obtain entrance into the system? The great sources of the supply of phosphates to man and animals are in the waters they drink and the vegetables they eat.

The quantity and *quality* of the phosphates contained in the water we use, is a subject not only of great interest, but also of great hygienic importance; at present we can but barely touch on the outlines of this important topic. It is not generally known by physicians, nor even by many of our chemists, that some waters that are largely drank contain an appreciable quantity of soluble phosphates. The water supplied to some of our large cities is very pure, being nearly free from foreign ingredients of any description; that supplied to other cities is quite impure, and where impurities of any kind exist, the phosphates are nearly always present; and I find, from repeated observations, that they are the chief cause of these waters assuming so quickly an unpleasant appearance and smell.

Many of the wells supplying our towns, villages, and farm-houses are fruitful causes of disease from the animal and vegetable impurities they contain.

In 1864 I repeatedly examined the Croton water supplied to the city of New York. My examinations extended to the water as found in the reservoirs, and also after it had passed through the pipes to the lower part of the city. These investigations were both chemical and microscopic. Suffice it at present to say that, during the summer months, finding a large growth of fungi and algæ in the water, I procured a large filter of animal charcoal, to pass all the drinking water through, so that I might thereby separate these impurities from the water. A vial filled with water before screwing on the filter, and also another vial filled with the water that was slowly filtered through the animal charcoal, were

[1] $PN_2,2HO,HO$. This latter unit, HO, may be, and is, easily converted to NaO, KO, CaO, etc. etc.

placed on my microscope table for examination, and stood there for some days. To my great astonishment, the filtered water, that looked at first so very bright and clear, was quite turbid, while the water in the other vial, that was not filtered, was almost as transparent and clear as when placed there. On examining the filtered water under the microscope I found it filled with bacterian bodies, so much filled that the water was turbid with them. On examining the other water I found a few algæ, such as I had before found, but no bacteriæ. Thinking that some accidental cause, which I had not guarded against, had produced this result, I passed some of the water, that had been through the filter, through a paper filter that was filled with fresh animal charcoal. This was put aside in a perfectly clean vial and covered with a piece of paper. Some days afterwards this was examined with the microscope, and was found to be as turbid as that first examined, and presented in great abundance the same bacterian bodies.[1] Some of the same kind of water was now taken and boiled with a quantity of animal charcoal, and filtered through paper while in a boiling condition, so as to ascertain that no germs had passed from the charcoal and produced the bacteriæ. At the end of a week this water was in the same condition as the others. At the same time I placed some of the animal charcoal in a vial, and filled the vial with cold water. This also was filled with bacteriæ. Under repeated experiments I found that water filtered through animal charcoal, to which a very small amount of sugar was added, would, if kept at 80° F., produce bacteriæ in great abundance in twelve hours, if placed in a good light; and in from twenty to forty hours, if cooler, and in a darker room.

Animal charcoal is composed principally of phosphate and carbonate of lime; and I find upon analysis that the purer the water the larger the amount of phosphates it will absorb from the charcoal; I find also that the phosphates, so absorbed, are not the insoluble phosphates of lime,[2] but the soluble tri-basic varieties, having an equivalent of water as one of its bases.[3] After a time all the soluble phosphates are dissolved out of the charcoal, and the filter then

[1] Some interesting experiments in a like direction have been published during the last month by Dr. Bastian, "On the Mode of Origin of the Lowest Organisms." A short review of this may be seen in the Atlantic Monthly for January, 1872, p. 121. Dr. B., by means of phosphatic solutions, tries to contradict the doctrine '*omne vivum ex vivo*," but his deductions are not rightly drawn.

[2] $3CaO,PO_5$. [3] $2CaO,HO,PO_5$.

becomes a mere mechanical strainer. If this same water is filtered through good loam, or through sand containing a small admixture of clay, the whole of the phosphates are abstracted from the water; and waters containing a large quantity of organic matter are rendered nearly pure by passing through earth containing argillaceous compounds, excepting where currents are formed.

It has usually been asserted that the deposition of calculi within the bladder is owing exclusively to the excess of carbonate of lime present in the water drank by the individual. The waters of certain localities notoriously produce such deposits; such, for instance, as the waters of Kentucky and portions of Tennessee. I have found the men of these localities large and powerful, and remarkable for the immense size of their bones. As an explanation of this peculiarity, I have found, by analyses of many of these Kentucky waters, that the soluble phosphates of lime,[1] combined sometimes with small quantities of alumina,[2] were present in considerable quantities. I have been repeatedly told that calculi were very frequent with men living in these regions, and it has always been explained to me as being produced by the excess of carbonate of lime present in these waters. My experience leads me to a different conclusion: I have analyzed several of these calculi as well as the water that the sufferer has used. As I have before said, I have found phosphate of lime in appreciable quantity in the water associated with carbonate of lime. I have by analysis found that these calculi were composed chiefly of insoluble phosphate of lime.[3]

Years ago, before the introduction of Croton water into the city of New York, there were many operations performed by surgeons for stone in the bladder. Now, with a much larger population, such operations are very few. Formerly the wells were the only source of water to the citizens, and it is well known that these wells were *all* more or less contaminated with organic matter, from surface drainage, and from drainage of sinks and other impure places. Such impurities never exist in water without the universal accompaniment—the phosphates. I am satisfied, from many observations, that phosphates that enter the animal system in that

[1] $CaO,2HO,PO_5$.

[2] CaO,Al_2O_3,HO,PO_5, also $2CaO,HO,PO_5$, held in solution with CaO,CO_2 by an excess of CO_2.

[3] $8CaO,3PO_5$.

manner (or rather from such impure sources) are associated with the urates, and do not perform the same functions as the phosphates that enter the system through the natural chemical elaboration of vegetable and animal life. In the one instance, they seem to be in a stage of retrogression; in the other, towards a higher development. It would almost seem that the ignoble source from whence they were derived produced deteriorating influences, and that they needed vitalizing before they could again become useful. There is another view also that may be taken of the subject. The solutions of the phosphates derived from putrescent animal secretions are always filled with the lower development of animal and vegetable life, and when viewed with the microscope always show a very abundant fauna and flora.

There are thoughts that dwell with us until they seem to be realities, and although by strict inquiry we cannot in any way of positive reasoning prove them to be facts, we are not the less ready to accept them in our own minds as facts. Force is known to us only through matter, and mind by the effect it produces on matter. In this view I cannot but feel persuaded, that impure food, unclean and filthy nutriment, obtained in a degraded manner, produces a physically unclean and morally impure blood—a blood that gives a physical derangement; a moral pollution; a spiritual infirmity.

It fully appears, by studying the wondrous works of the great Creator, that He has made no sudden advancement in creation, but that every improvement is but a step in advance of that which preceded it. We have entered into the consideration of phosphoric acid and its compounds, showing the great advantages which it possesses over any other acid with which we are acquainted. Plants, however, have organic acids but a few steps below phosphoric acid in some of their properties: thus, tartaric, citric, meconic, and oxalic acids are polybasic, and are of the greatest consequence from this peculiarity, in the organismal arrangements and necessary mutabilities of the living vegetable. Tartaric acid is bibasic, and has all the power of mutability needed for the lower organization of the inferior class of vegetables. It forms a chain of two based salts, which render it highly useful.[1] As plants become more

[1] "The classes of tartrates and racemates that have long been known to chemists are bibasic salts. It is the character of a bibasic acid to unite at once with two different bases of the same neutral family, which accounts for the formation of Rochelle salts, the tartrate of potassa and soda, of which the formula is KO,

highly endowed (and therefore more capable of forming the tissues of animal bodies), they approach nearer in organismal constituents to the animal frame; the bibasic salts still exist, but exist more abundantly in fruits, and in those vegetables that are eaten in an uncooked condition. The acids just mentioned, which exist as supra- or bibasic, are found in those substances which act rather as condiments, than what we might strictly term *food* to man. They are food in a strict sense of the word, because the constituents of which they are composed are necessary to man's health and comfort; but the organismal elements they contain are not wholly sufficient to animal sustenance. The supra- and bibasic acids of plants possess great advantages, in a chemico-physiological way, over the lower acids in plants. But the bibasic acids do not give sufficient vital organismal activity to plants to enable them to subserve the highest development, which alone fits them to sustain animal life, with its wondrous power of mental energy. Higher orders of plants are necessary for nourishment, where higher mental capabilities are required; and all plants that have a higher nutritive power have the tribasic acid—phosphoric, to develop them to a higher organization. We have spoken of phosphoric acid, and its marvellous power of mutability, adapting it as peculiarly fitted to be, *par excellence*, the organismal acid of the animal economy; but as yet we have said but little of the sources whence the phosphoric acid is derived which nourishes the animal system.

Phosphoric acid, in some one or other of its combinations, exists to a greater or less extent in all the cultivable soils of the earth. By improper cultivation of a soil the phosphates are often found to become less in quantity, and often to be entirely changed in their forms of combination; the fertility of many soils that are perfectly barren to all useful grains, is restored simply by supplying a due amount of those phosphates that are capable of being assimilated.[1]

$NaO,+C_8H_4O_{10}$. It is also stated that gallic acid is bibasic, the gallate of lead being thus composed: $2PbO+C_7HO_3$. Now if we attempt to make this a monobasic salt by dividing the equivalents both in base and acid by two, an equivalent of gallic acid would come to contain half an equivalent of hydrogen, which Liebig considers conclusive against the division of its atomic weight."

[1] Spectrum analysis has not as yet determined whether it is to be found in any of the planetary bodies. If by careful spectrum analysis it is found to be absent in any planet, we can at once assert that animal and vegetable life, as we are acquainted with it, is absent in that planet; but if its presence is positively determined in any planet, we can with great probability infer that both animal and vegetable life of a high order may there exist.

Phosphoric acid, in some combination, has been found by chemists to exist in all the higher orders of vegetables. The amount of phosphoric acid present in a plant, or the amount of phosphoric acid combined with a base, has generally been determined by incinerating a plant, and estimating the amount found in the ashes. This I have long considered a very insufficient method of analysis; as, by this means, it is utterly impossible to find it in the exact state in which it existed in the plant. I am aware of but very few analyses, and those few of very recent date, where any distinction has been made, in the analysis of plants or of animal tissues, between the soluble and insoluble phosphates; and yet the nutritive value of a plant containing the soluble phosphates is infinitely greater than another containing the insoluble variety. Chemists have hitherto estimated the phosphate present as phosphoric acid,[1] phosphate of lime, phosphate of magnesia, etc., and these are the only formulæ they could arrive at by the methods employed. I have spoken at some length of the peculiar modifications which phosphoric acid assumes. I have spoken of them in this way, not only because I have so found them in the chemical laboratory, but because I have so found them in animal and vegetable tissues. Instead of proceeding by the incorrect method of analysis hitherto used, I have followed methods that have given me the peculiar combinations as they exist in the living plant or tissue.

The value of the various grains that furnish food to man has been estimated by the amount of nitrogenous elements found in them; thus, beans contain 5.5 of nitrogen, lentils 4.4, peas 4.3. Chemists, however, acknowledge that these leguminous seeds are not so nutritive as wheat, which contains but 2.3 per cent. of nitrogen. Liebig endeavors to account for this in the following manner: "The small quantity of the phosphates which the seeds of the lentils, beans, and peas contain must be the cause of their small value as articles of nourishment, since they surpass all other vegetable food in the quantity of nitrogen which enters into their composition. But as the component parts of the bones (phosphate of lime and magnesia) are absent, they satisfy the appetite without increasing the strength." This to a certain extent is perfectly correct; but there is another difference not pointed out, and perhaps not thought of by Liebig.[2] Fresenius has stated, that nearly the

[1] PO_5, $3CaO,PO_5$, $3MgO,PO_5$.

[2] Fresenius, Ch. Anal., p. 512.

whole of the ashes left by incineration of wheat consists of phosphates, but he as well as others[1] have failed to designate the peculiar combinations in which the phosphates existed in the wheat, the peas, beans, and lentils. I have made analyses of wheat of the soft, white, thin-skinned variety, selecting fine plump seed, and have found, by incinerating the berry and examining the ashes, about 57 per cent. of phosphoric acid. In another analysis of the hard, thick-skinned Mediterranean wheat I found the ashes to yield 60 per cent. of phosphoric acid. These analyses were by the usual methods employed. Upon a more extended examination,[2] and made in a more correct manner, to ascertain what peculiar combination this phosphoric acid was in, I found in the white wheat that over two-thirds of the phosphates present were of a soluble variety,[3] while the one-third consisted of insoluble phosphates.[4]

Of the red hard-skinned variety, I found but little over one-half of the phosphates were of the soluble varieties; but the combinations of both varieties were the same as those in the white wheat.

In examining the bran from wheat, I divided it into two varieties: that which is external, thick, and coarse, and that which is internal, thinner, and of finer structure, with small amounts of flour adhering.[5] The outer coarse bran was rich in phosphates of the in-

[1] Noad's Chem. Anal., p. 519 to 537.

[2] A quantity of well selected white wheat, and also a like quantity of red wheat, were well washed repeatedly in distilled water and dried at a temperature of 240° F.

A given quantity of these samples were carefully crushed and repeatedly washed with distilled water, slightly impregnated with pure creasote, until all soluble matters were extracted. The amount of phosphates that were soluble were thus extracted and determined, and were found to be two-thirds of the whole quantity as found in the same wheat by the analysis of the incinerated wheat in the white variety. In the red variety one-half of the phosphates proved to exist in this variety were soluble.

[3] $MgO,2HOPO_5$; $2KO,HO,PO_5$; $NaO,2HO,PO_5$.

[4] $8CaO,3PO_5$; $3MgO,PO_5$; $3Fe_2O_3,PO_5$.

[5] The organized products residing in the outer layer of the wheat grain have hitherto been discarded as bran, or if retained, as they are in Graham flour, their peculiar nutritive quality is hardly made available for the system in the mode in which such flour is made and used. They differ in their nutritive value from the ordinary medicinal phosphates from the fact of being part of the living organization of plants. A portion of these phosphates may be examined by making a decoction of bran, filtering and evaporating to dryness. I have used a decoction of bran where there is want of nourishment, and have found it serviceable in marasmus, rickets, chronic diarrhœa, and impaired nutrition generally. Many

soluble varieties, but contained but small amounts of phosphates of the soluble varieties. The reverse was the case with the finer inner bran, for in this the soluble phosphates were in large excess over the insoluble varieties. I have treated this fine inner bran and extracted another phosphate, which, by all previous methods of analysis, has not been found at all, and I think I shall prove hereafter that this variety is the most important of all the phosphates; it is the one which has an equivalent of nitrogen in its composition;[1] one corresponding with the peculiar phosphate of the brain in man.[2] The phosphates existing in peas, beans, and lentils are much smaller in quantity than in wheat, and about two-thirds of the quantity existing are of the insoluble varieties. Thus we see that if nitrogen exists in larger quantities in peas and beans, the phosphates, and especially the soluble phosphates, exist in larger quantities in wheat.

In continuing these researches of the phosphates in vegetables, I found that the phosphates in onions are nearly all of the soluble variety; and that the onions contain hypophosphites of an unstable and easily changeable character, which readily unite with hydrogen, forming phosphuretted hydrogen. The odor of the plant is partly due to this, and not altogether to sulphuretted hydrogen, as hitherto asserted.

In analyses which I have made of young leaves of wheat, rye, peas, and spring grass, I found the soluble variety of phosphates largely present in all of them. These soluble varieties of phosphates I have found nearly always present in medicinal decoctions and infusions of plants that are young and succulent; they may even easily be shown to be present. Thus, if a decoction of digitalis, hyoscyamus, catnip, or good common tea is filtered into a well cleansed glass, and a small quantity of a solution of sulphate of magnesia, saturated with chloride of ammonium, is added, the glass within, twenty-four hours will be coated with a deposit of

of the phosphates have been found useful in therapeutics, but none are of more value than those that are of vegetable origin, having passed through plant life, and thus become more highly vitalized.

[1] I am still pursuing my experiments on this subject, and hope soon to produce from wheat a highly organized nitrogenous phosphate.

[2] This peculiar phosphate may be extracted from the fine inner bran by digesting it in the lighter and highly volatile gasoline fluid; percolating, *in vacuo*, through a large quantity of this fine bran, and then permitting the fluid to drop on a watch glass just sufficiently fast to allow one drop to evaporate before another falls; an oleaginous compound is left which contains the nitrogenous oleo-hypophosphites.

ammoniaco-magnesian phosphate.[1] As plants grow older, the combinations in which the phosphates exist change constantly according to the necessities of the fruit and the seed; but what little phosphates exist in an annual or perennial plant, when past maturity, are of the insoluble variety.[2]

The object in making these experiments was to ascertain if in the vegetable the phosphates existed in the same mutable and easily variable conditions as they existed in the living animals, such, for instance, as those we have before described.

With the description of phosphorus that I have before given, and with the analyses of plants I have here presented, which have cost me many years of labor, we can almost describe the varied changes that are taking place in the different periods of growth of our grasses, fruits, and seeds.

Let me take for example the wheat, making careful analyses, and tracing only the phosphoric acid, and noting the various combinations into which it enters during the growth of the plant. I have stated that in the wheat seed, nearly two-thirds of the phosphates present consisted of the soluble variety, the balance of the insoluble variety. If a quantity of wheat is carefully dug up when the plant has been growing a week or ten days, and the decayed and used up seed is carefully separated from the young plant, dried, and incinerated, the smallest trace only of phosphates will be found. The growing plant has absorbed both soluble and insoluble variety. I have examined also the young plant, detached from the root, and have found a large quantity of soluble phosphates;[3] upon incinerating the same plants thus exhausted, but a mere trace of insoluble phosphate of lime is found to exist.[4] As the plant becomes larger, a change takes place in these combinations. We still have the soluble salts of soda and potassa, but as the stalk of the plant needs strength to keep it upright, we have the neutral phosphates of lime and magnesia, and in addition silicates of the alkalies and fluorides. These increase largely with the growth of the plant, until all the straw and coverings of the grain become coated with this smooth hard glaze. As the grain begins to form, the albumenized juices are held in solution by a [5]phosphate of soda and ammonia, and at this stage scarcely a trace of [6]basic phosphate of

[1] $2MgO,NH_4O,PO_5+12HO$.
[2] $8CaO,3PO_5$.
[3] $2KO,HO,PO_5$; $NaO,2HO,PO_5$; $MgO,2HO,PO_5$; $CaO,2HO,PO_5$.
[4] $8CaO,3PO_5$.
[5] NaO,NH_4O,HO,PO_5.
[6] $8CaO,3PO_5$.

lime is to be found in the berry. In the next stage of the berry I have found an oleo-albuminoid phosphate. As the grain arrives at perfection the phosphates are almost absent in the straw, for all that existed in the plant, and all that it daily absorbed from the soil, is congregated in the young grain, and that mostly around the outer covering.

The changes of the phosphates in the onion are quite as varied as those in the wheat. I have made analysis of the large onion bulb, ready to plant in the spring to produce seed, and I find that it contains from 16 to 20 parts in 1000 of phosphoric acid in a great variety of combinations. The phosphates here existing I find to be nearly all of the soluble varieties, consisting of those of lime, soda, potassa, and ammonia, with some oleo-phosphate, and in addition a compound with hydrogen, which is readily converted into phosphoretted hydrogen. These combinations continue in the plant, with no great alterations until the flower forms, when the phosphate of ammonia largely increases; but as the seeds begin to harden, the ammonia and basic water begin to disappear, and when the seeds are ripe the insoluble phosphates are nearly three-quarters of the amount of the phosphates present. The decaying stem has hardly a trace of phosphates. The seeds of the onion are not intended for food; and the phosphates stored therein are different in combinations from those found in the wheat. By the experiments and analyses I here give, I demonstrate that it is more the *quality* than the *quantity* of phosphates to which beneficial results are due.

Let me look for a higher organism—the babe at birth. The bones of the legs and the arms are so soft as to be easily cut; they are so deficient in calcareous matter that they could not support the child's weight without bending. Phosphates of lime and magnesia are found in these bones, but they are the phosphates which, though tribasic, do not contain the same base in the three associated units, but have different bases; for we find in the soft infantile bones a larger amount of basic water and a smaller amount of lime than in adult life, and also an appreciable quantity of uncrystalline gelatinous hypophosphite. As the child grows, and the bones harden, a unit of basic water is gradually changed for a unit of basic lime; and as the child begins to walk we have two units of basic lime to one of basic water.[1] This formula continues

[1] $2CaO,HO,PO_5$.

for some years at the extremities of the bones, while the shaft of the bones rapidly acquires three units of basic lime.[1]

The bones of the skull for several years remain elastic and yielding, and magnesia is found in large proportional quantities associated with gelatine, which at birth forms two units of the tribasic phosphate. The bones remain elastic till the sutures begin to close, when we have one unit of magnesia, one of lime associated with one unit of gelatine. As life advances, and the bones acquire great durability, we have a different formula.[2]

The ends of most of the bones are cartilaginous; and here we have a bibasic gelatinous phosphate, which, as puberty arrives, becomes converted into tribasic phosphate of lime and magnesia.[3]

The soft pulpy tooth, containing an insufficiency of lime, is gradually converted into tribasic phosphate of lime and magnesia, but this not being hard enough, it associates with itself the vitreous fluoride of calcium.[4]

The blood is continually receiving fresh accessions from the mother's milk, and carries to all parts of the body phosphates in a soluble form, and leaves them in the tissues in some solid state. The fibrin and albumen are liquid in the blood; they become solid in the tissues, in part owing to a change in formula of the phosphates which help to hold the nitrogenous substances in solution.

To properly perform its functions the blood needs to be kept slightly alkaline, and yet not too alkaline. We have before shown that in the blood and many of the secretions there is albumen and albuminoid substances which are held in solution by the alkalinity of the fluids, and would become solid if these fluids were acid. We have shown how the monobasic phosphoric acid has the power of coagulating albumen. We find in the venous blood a mild alkaline compound, containing two units of soda and one of basic water combined with one of hypophosphorous acid. This passes through the lungs forming phosphoric acid by the absorption of four units of oxygen, and helps the blood-globules also to be carriers of additional oxygen. Passing through the systemic capillaries it

[1] $3CaO,PO_5$. [2] $5CaO,MgO,2PO_5$.

[3] We are speaking only of the phosphatic compounds, and do not, of course, mean to exclude the carbonate of lime and other combinations.

[4] In 1000 parts of the ash of the dentine 640 are phosphates; in the enamel of the teeth 880 are phosphates.

parts with its four units of oxygen, its oleo-phosphate, and generally all the phosphates, deposited in the tissues for new growth. The phosphates found anew in the venous blood are derived from the absorbed particles of metamorphosis: part of these are carried out of the system through the kidneys in conjunction with the urates,[1] and part is renewed into nutrient combinations in passing through the lungs. Independent of analysis, we see this to be the fact in long wasting sicknesses and in starvation, where the teeth, the nails, newly deposited bone around a fracture, etc., are absorbed to furnish phosphates for the brain and nervous system.

The fluids which permeate the muscles and cellular tissue, in opposition to the alkalinity of the blood, are always either slightly acid, or neutral, and the phosphates in these secretions are acid, phosphates of potassa, water and ammonia.[2] These are very changeable salts, readily absorbing more ammonia, potassa, soda, or lime, and becoming neutral.[3]

The adipose structure has also its peculiar phosphate. We have, as the stable phosphates of these tissues, the oleo-phosphates which in the blood of the veins is found as oleo-hypophosphites.

In the cartilaginous structure (so abundant in the infant which changes as age advances into bone) we have a phosphate of peculiar character consisting, in early infancy, of one unit of magnesia, one of gelatine, and one of water. In those tissues which remain cartilaginous and only become more dense, we find two units of magnesia and one of gelatine; while in those which are being gradually converted into bone, we find lime gradually taking the place of both magnesia and gelatine, until in old age the bones are composed of the insoluble phosphate of lime.

The adult differs from the infant, in its requirement for phosphates, only in the chemical character of the compounds. This is perhaps seen more easily in injuries which may happen to either. The child falls and injures the bones of its arm; it does not amount

[1] "Lehmann found that while living on ordinary mixed food he excreted 1.09 grammes daily in the urine, and that while living on purely animal food, in sufficient quantity to satisfy, 3.56 grammes."

In the urine of pregnant women I frequently find an entire absence of phosphates. The same is true with young growing children, but with children that are overfed they may be found in great abundance.

I have found that children that are permitted to eat inordinately of candy lose more phosphates than the system can spare in urine.

[2] $KO,2HO,PO_5$; $NH_4O,2HO,PO_5$.

[3] $2NH_4O,HO,PO_5$, or NH_4O,CaO,HO,PO_5.

to a fracture; the soft bone is bent, and inflammation and its sequelæ are the only results: but if the adult meets with a like injury a solution of the continuity of the bone takes place, and motion is rendered impossible. An adhesion of these broken surfaces must take place, but before this can happen the ragged and uneven particles of bone must be absorbed; and an acid phosphate, possessing great power of solution, bathes the abraded edges and softens, dissolves and absorbs the hard bone earth; as soon as this is fully accomplished a plastic phosphate, containing gelatine, lime, and water, is thrown in mass around the broken edges and cements them together. The soft material daily becomes harder by the change of the basic water for basic lime; when the arm is restored to use, but a small callus is formed around the bone; and the fractured part is often stronger than before.

During all periods both of growth and decay of the body, the phosphates are taking an active part in assisting in the transfer of the liquid fibrin, albumen, and gelatine in the blood into solid muscular structure and hardened cartilage. All of the component parts of the animal body become liquid in the milk of the mother, and again become muscle, and other firm structures in the body of her nursing babe. These transmutations are aided by the variable modifications which phosphorus assumes.

Phosphorus exists in a different combination in albumen, casein, fibrin, gelatine, etc., but the formula which exists is exactly suited to the transitions and mutations which each must undergo from liquid to solid and from solid back again to liquid. Many of these changes go on in such a way that we cannot see what takes place; we but see the result, and know that no other substance with which we are acquainted could accomplish such wonderful transmutations and metamorphoses.

"Chemical analysis has led to the remarkable result, that fibrin and albumen contain the same organic elements united in the same proportion, so that two analyses, the one of fibrin, the other of albumen, do not differ more than two analyses of fibrin or two of albumen respectively do, in the composition of 1000 parts." This conclusion of Liebig's is confirmed by Dénis, who has succeeded in converting the one into the other. We have several times stated that the tribasic and bibasic phosphoric acid have no power of coagulating albumen, but that the monobasic acid has that power of coagulation. In all the albuminoid fluids that I have examined I find the tribasic acid; in fibrin I find a mono-

basic acid. Thus this simple change is probably the chief cause of the metamorphosis of one of these nitrogenous compounds into the other.

In the previous pages I have shown, with considerable minuteness, the transitions and recombinations that take place with phosphorus, and all its compounds, under the simplest chemical manipulations in the laboratory: in many of the instances I have here presented, I have shown the peculiar mutations, variations, and combinations that phosphorus undergoes in organized animal tissues:[1] I have shown also the daily changes in combination that are taking place in growing vegetables. From the facts collected, I am, I think, correct in assuming that, in suitable conditions within the living organism, peculiarities and changes like those that take place in the laboratory would manifest themselves. We can never expect to see within the impenetrable penetralia of living structure, so as to notice the changes that are momentarily taking place; we but see the results, and from them draw our inferences. The many analyses of animal and vegetable tissues and secretions I have given furnish data sufficient from which to draw results.

Whether I have or have not proved all the organismal value that I have claimed for phosphorus, it cannot be denied, that, in some one or other of its manifold formulæ, it is present in every tissue of the body, and takes an active part in every metamorphosis, ministering in the performance of functions greatly different in character; and under all changes of condition accommodating itself, by its great power of variability, to become an active participant either in the removal or renewal of every structure.

The "Bridgewater Treatises" have been written, showing the bounty of the Creator in His various works. Bell points out the "goodness of God in the mechanism and vital endowments of the hand." With equal propriety, in these pages, I have faintly shown the wondrous order and harmony with which the Creator has endowed His organismal element—phosphorus.

[1] "It is almost self-evident that no salts of any other acid could be so usefully applied to the metamorphosis of tissue as those of phosphoric acid."—*Lehmann's Physiological Chemistry.*

"Phosphoric acid is one of the links by which mineral and organic compounds are connected, and it may be reasonably supposed that it is that pliancy of constitution which peculiarly adapts the phosphoric above all other acids to the wants of the animal economy."—*Graham's Elements of Chemistry.*

PHYSIOLOGICAL ACTION OF PHOSPHORUS.

From a large number of experiments which I have performed, I present a few as type cases.

EXPERIMENT 1. *May 1st.*—At 11 o'clock, A. M., I administered to a strong, healthy mongrel dog four grains of phosphorus dissolved in oil. At 2 o'clock the dog vomited several times. Attempts at vomiting, with strong contractions of the stomach and abdominal muscles, followed. The dog refused to eat or drink, and had a very dejected appearance. It was uneasy, and remained but a short time in any one position.

2*d.* The dog still looks dejected and uneasy, and still refuses to eat, but drinks a little water. The respirations and the pulsations have both decreased in frequency. A little urine collected shows a very deep biliary coloring, but contains no albumen. The temperature has fallen two degrees.

3*d.* Still refuses to eat, but drinks fresh water freely, and soon after passed about four drachms of urine, which was strongly colored with bile, and contained a large amount of albumen. Pupils widely dilated.

4*th.* Still refuses to eat, and lies in a state of indifference and stupor. The pulse slow and feeble, the respirations imperfect and irregular.

5*th.* The dog was found dead this morning. The cornea were injected and very yellow; on the right one was an ecchymosed spot as large as a pea. Where white hair was seen, the skin was of a yellow color. On dissecting the hide from the abdominal and pectoral muscles, the cellular tissue was of a deep yellow color. The abdominal muscles were flabby and of an oily appearance; and upon examining portions of them with the microscope they were found infiltrated with oil globules. Upon opening the abdominal muscles, the stomach and intestines were found to be *in situ*, but small, collapsed, and pale. On taking out the stomach and intestines, there was no fecal matter excepting in the rectum. A small amount of thin, yellowish, mucous matter was found in the stomach; the mucous membrane was reddened in patches, some spots not larger than a millet seed, and others of an inch in length; there were also discolored, dirty-brown patches, and the whole mucous membrane was soft and easily detached.

In the upper portion of the duodenum was an ulcerated spot of half an inch in diameter, but the ulceration did not descend beneath the mucous coat; the lower portion of the duodenum was deeply tinged with bile, and this extended some distance into the small intestines. Throughout the small and large intestines there were numerous reddened patches which *looked* like bruises; some of these were quite small, and some an inch and a half in length but not broad.

Upon removing the liver, it was found large, of a soft, doughy, consistence, of a dirty, brownish-yellow color; and upon the upper surface were several large ecchymosed spots. Upon cutting into the liver, the blood that flowed was dark and thick, pitchy, but not coagulated. By microscopic examination of a portion of the liver the hepatic cells were very imperfectly preserved; no distinct nucleus could be seen, and the whole cells were degenerated with oily infiltration and masses of biliary pigment. But few perfect blood discs could be discerned on examining the blood. The gall bladder was distended. Upon opening it the sac was found coated with a pasty, oily mass, which, on closer examination, seemed to be bile-pigment, mucus, and oil.

The kidneys were enlarged, soft, and of an oily appearance. Upon the cortical portion of the right one was a large ecchymosed spot; upon cutting through, this ecchymosis extended into the medullary substance. Under the microscope both cortical and medullary substance presented a broken-down mass, in which nothing could be distinctly defined but oil globules.

In the bladder was about half an ounce of urine, which had a chylous, milky look; it was yellow as well as opaque, and highly albuminous.

Upon opening the thoracic cavity, the lungs were much collapsed. Upon the pleura-pulmonalis were several reddened patches, the surface of which, when scraped off and examined under the microscope, was found to be composed of broken-down blood discs and fat globules. The pulmonary arteries contained much dark, pitchy looking blood, and the inner surface was smeared with the same substance, which was not easily wiped off. The air cells of the lungs were smeared over with the same oily, slimy substance.

The heart was enlarged, soft, and flabby to the touch. Several ecchymosed spots were visible on the pericardium. Neither of the chambers of the heart was distended with blood; but all contained more or less dark, grumous blood, of a slimy feel, and

of the consistence of molasses. The muscular fibres of the heart were infiltrated with oil.

The inner membranes of the arteries and larger veins were thickened, softened, and easily separated; smeared with oil and broken-down blood globules.

The muscular structure of the heart of this dog was in a state of disintegration; it was not that fat existed around the muscular fibres and encased them, leaving the striated fibres visible and unchanged; but everything seemed permeated by the oil, and its structural form destroyed. It had not the appearance of fat which accumulates in the healthy system, but every muscle which I examined, from different parts of the body, was permeated and infiltrated with oil. It was true "fatty degeneration."

A number of microscopic specimens were made.

EXPERIMENT 2.—The web of a frog's foot was carefully placed for inspection by the microscope; the circulation of the blood was found to be quite natural. Ten minims of a saturated solution of "phosphorated oil" were now injected under the skin. Almost immediately the circulation was quickened and continued to increase until it became very rapid. Gradually it became less rapid, until, at the expiration of an hour and a half, it was less rapid than normal. Other changes also began to take place; the white corpuscles no longer held their separate position, but were mingled in the current of the blood; the capillary vessels were dilated, and many small red, dark bodies were observed floating in the blood current. By frequent watchings, the next change noticed was an adhesion to the vessel of one of these dark bodies, and a slight narrowing of the current in consequence; then a red blood disc adhered to the cardiac side of this dark body, and very quickly collapsed, spreading itself upon the side of the vessel; then another blood disc adhered to the edge of this, swaying for a short time backwards and forwards, but eventually adhered and collapsed like the other. Soon this capillary vessel became closed, the general circulation in the web became slower and more difficult, and even the larger capillaries began to fill with the broken-down blood-discs. The current of blood that flowed into the larger vessels was largely intermingled with these dark bodies, and the liquor sanguinis was of dark color. The circulation entirely ceased in the foot in 3.20 hours after the oily injection, but the frog's heart did not stop beating for about an hour afterwards. The liver and heart were

soft and oily; for want of time the other organs were not examined. The frog was kept wet during the whole time.

EXPERIMENT 3.—(*a*) Six grains of phosphorus, rubbed up, in the usual way, with flour to form a paste, were added to two drachms of carbonate of magnesia, and the whole passed down the throat of a dog.

(*b*) To another dog were given six grains, rubbed up in like manner with two drachms of carbonate of lime.

(*c*) To another dog, six grains, with two drachms of carbonate of ammonia in thick syrup.

(*d*) To another dog, six grains, with two drachms of freshly precipitated hydrated peroxide of iron.

(*a*) Died on the fourth day; (*b*) on the third day; (*c*) on the third day; (*d*) on the fifth day.

We see then that neither of these substances retards, as has been asserted, the physiological action of phosphorus.[1]

EXPERIMENT 4.—Six grains of phosphorus were rubbed up with an ounce of melted mutton suet. When cold, the whole was given to a dog. He died the third day after taking it.

EXPERIMENT 5.—Six grains of phosphorus were rubbed up with an ounce of melted mutton suet. The whole was passed down the throat of a dog, which was securely tied and laid on the left side. An India-rubber tube was now passed into the stomach; this tube was attached at the other end to a large jar charged with highly oxygenated water, under heavy pressure. Every few minutes a

[1] ANTIDOTE TO PHOSPHORUS.—Messrs. Eulenberg and Vohl have shown that phosphorus is so readily absorbed by carbon, that, taken in the form of pills, carbon constitutes a complete antidote. The pills are made of animal charcoal, powdered and mixed with a little gum. In match factories these pills have relieved operatives poisoned by phosphorus, and are, therefore, a much better remedy than that proposed by M. Personne; the essence of terebenthine having been found to produce violent headaches by continued use.

This is extracted from a medical paper just received. I have not had time left me to try the asserted efficacy of animal charcoal as an antidote, but I doubt the correctness of these assertions.

It will be remembered that the red or amorphous phosphorus is now used in all the German match factories, and that this substance is not poisonous except in enormous doses. I have seen many statements of other substances being used with perfect antidotal power, but they were all used with this red phosphorus, not with the ordinary "waxy" variety such as was formerly used.

little of this water was allowed to run into the stomach, until in about three hours the bottle was emptied. Frequent inhalations of oxygen were also given. The dog was untied, and except a little stiffness from confinement seemed to suffer no inconvenience.

EXPERIMENT 6.—Six grains of phosphorus were given in like manner to another dog. In about one and a half hour the dog made the first effort at vomiting. It was immediately tied down; and oxygenated water given as in the previous case, also frequent inhalations of oxygen. The dog was quite dejected for some days, but recovered.

EXPERIMENT 7.—Six grains of phosphorus were given in like manner to another dog; and within a few minutes an ounce of old common spirits of turpentine was thrown into the stomach. The dog was quite uneasy for some hours; but the next day had recovered, and did not seem to have suffered any injury.[1]

EXPERIMENT 8.—Six grains of phosphorus were given in like manner to another dog; and one and a half hour afterwards an ounce of spirits of turpentine. Great uneasiness was shown, but there was no vomiting. The next morning the dog was dead; upon post-mortem examination, the liver, heart, and lungs presented the appearances before described: the kidneys were much enlarged; soft, doughy, oily and very much ecchymosed.

We find by experiments 5 and 7 that oxygenated water and spirits of turpentine are both antidotal to phosphorus, provided they are administered before the poison is absorbed; but, if absorption has taken place, the danger, under any treatment that we know of, is very imminent.[2]

[1] I would refer to two cases of phosphorus poisoning, one reported by Dr. S. O. Habershon, and the other by Dr. T. Hillyier, in Med. Chir. Trans., 1868.

Turpentine an antidote to phosphorus. Bul. de Thér., 75, p. 269, Sept. 1868; Gazette des Hôp., 1869, No. 65; Bul. und Wochen., 1870, No. 50; Deutsches Arch., 1867, p. 4; Pharm. Central., 1872, No. 16.

It seems to be acknowledged that *pure* oil of turpentine (free from oxygen) is not antidotal to phosphorus.

[2] Cases 6 and 8, also page 620.

Prof. Bamberger proposes as an antidote the soluble salts of copper. See a paper on the Antidotes in Acute Phosphorus Poisoning, *Wiener Med. Presse*, Jan. 21, 1872, and New Remedies, by H. C. Wood, vol. ii. No. 1, p. 54.

EXPERIMENT 9.—The house being troubled with rats, phosphorus paste, freshly made, was spread upon bread and left around at night-time. In the morning three rats were found dead.

The lungs and heart were filled with black, pitchy blood. The livers were of a deep yellow color. In one, the stomach was deeply inflamed; in the others, ecchymosed spots only were seen. In all, the kidneys were inflamed, enlarged, of reddish-brown color, and oily. In the bladder of one was a small quantity of urine, which became almost solid upon application of heat.

EXPERIMENT 10.—Wishing to try the action of phosphorus in poisonous doses on a horse, I procured a horse pronounced hopelessly incurable of a lameness that rendered him useless.

A black gelding, seven years old, sixteen and three-quarters hands high, of a nervous temperament. He was lame in the left coxo-femoral articulation, the nature of which was obscure, but it caused a peculiar spasmodic contraction of the flexor muscles of that leg which would occur several times in the course of an hour; otherwise the animal seemed healthy. In order to demonstrate the action of phosphorus, the animal was placed under treatment. The preparation used consisted of ninety-six grains of phosphorus, added to sixteen ounces of melted suet, which was agitated until cold; no other medicine was given. The following is a record of the changes as they occurred:—

Date.	Pulse.	Resp'r.	Temp're.	Remarks.
February 1, 6 P.M.	56	12	101	
" 2, 8 A.M.	56	12	101	
" 2, 1 P.M.	56	12	101⅕	
" 2, 6 P.M.	48	12	101⅕	℥j of the phosphuretted suet given three times a day from this time.
" 3, 8 A.M.	48	8	101⅕	
" 3, 2 P.M.	48	8	101⅖	
" 3, 6 P.M.	48	8	101⅖	Increased appetite.
" 4, 8 A.M.	40	8	101⅖	Increased appetite.
" 4, 6 P.M.	42	8	101	Increased appetite.
" 5, 8 A.M.	42	8	102	Respiratory murmur in lungs heard now distinctly.
" 5, 12 M.	42	5	103	
" 5, 6 P.M.	40	6	102	
" 6, 8 A.M.	47	4	101⅖	Frequent erections of the penis.
" 6, 12 M.	48	5	101⅗	
" 6, 6 P.M.	48	5	102	Frequent erections of the penis.
" 7, 8 A.M.	48	6	101⅗	Penis full and distended all day.
" 7, 12 M.	46	5	102	
" 7, 6 P.M.	44	5	101⅘	
" 8, 8 A.M.	44	4	101	℥iss dose three times a day.
" 8, 12 M.	48	4	102	
" 8, 6 P.M.	45	5	102⅕	
" 9, 8 A.M.	44	5	102⅗	Appetite very good.
" 9, 12 M.	44	4	101⅘	Frequent erections of penis.

Date.	Pulse.	Resp'r.	Temp're.	Remarks.
February 9, 6 P.M.	44	5	101⅘	
" 10, 8 A.M.	40	4	101	In micturating, as soon as penis was protruded the urine passed in a sudden and copious stream, quite clear.
" 10, 12 M.	44	4	101⅘	
" 10, 6 P.M.	48	5	102	
" 11, 8 A.M.	44	5	101	
" 11, 6 P.M.	40	5	101⅕	
" 12, 8 A.M.	40	4	101⅕	
" 12, 12 M.	42	5	102	
" 12, 6 P.M.	44	5	101⅕	
" 13, 8 A.M.	40	5	101⅕	
" 13, 12 M.	42	4	101	
" 13, 6 P.M.	40	5	101⅘	
" 14, 8 A.M.	40	4	101⅕	
" 14, 12 M.	44	5	101⅗	
" 14, 6 P.M.	40	5	101⅕	℥ij three times a day.
" 15, 8 A.M.	44	5	101	
" 15, 12 M.	40	4	101⅘	Spasmodic action increased, and now exists in both hind legs.
" 15, 6 P.M.	42	5	101⅗	
" 16, 8 A.M.	38	4	101⅘	
" 16, 12 M.	36	4	101⅘	
" 16, 6 P.M.	44	4	101⅘	
" 17, 8 A.M.	44	5	101	
" 17, 12 M.	40	4	101⅕	
" 17, 6 P.M.	42	5	101⅗	
" 18, 8 A.M.	40	4	101⅘	
" 18, 6 P.M.	40	4	101⅘	℥ijss three times a day.
" 19, 8 A.M.	48	5	101⅘	
" 19, 12 M.	44	5	101⅘	
" 19, 6 P.M.	44	5	101⅘	
" 20, 8 A.M.	46	6	102	Labored respiration.
" 20, 12 M.	48	8	102⅕	
" 20, 6 P.M.	50	12	103	
" 21, 8 A.M.	56	16	103⅖	
" 21, 12 M.	70	18	104	Clicking sound of velum palate at every respiration.
" 21, 6 P.M.	80	20	104⅕	
" 22, 8 A.M.	60	12	104⅖	
" 22, 12 M.	70	14	104⅗	
" 22, 6 P.M.	80	16	104⅖	
" 23, 8 A.M.	80	18	105	
" 23, 12 M.	82	24	105⅖	Spasmodic respiration.
" 23, 6 P.M.	84	32	105⅕	

The animal died at midnight.

Post-mortem, February 24, 8 o'clock A.M. Upon removing the skin, the muscles were pale, soft, flabby, and of an oily feel. Intestines injected in patches; ecchymosed spots in the stomach, and general signs of gastritis; rectum thickened and congested. Heart pale; weight six and a half pounds; the left ventricle presented some ecchymosed spots. The liver presented a yellow color, which was more marked on the left lobe; it was easily torn; on making incisions it presented a waxy appearance; weight fourteen and a half pounds. The kidneys were pale, but to the unaided eye presented but little change. The lungs were congested, and there

were some ecchymosed spots on the pleura. Careful inspection showed fatty degeneration of the whole system. There was an incurable disease at the hip-joint.

Microscopic specimens from dogs, cats, rats, and horses have been prepared, and some of them are sent with this essay, showing fatty degeneration from phosphorus in all its stages.

I have made seventeen post-mortem examinations on dogs poisoned with phosphorus. In most of these cases the phenomena I have described in Case 1 are visible in a greater or lesser degree. If the animal lingers for several days, the appearances I have above described are nearly always present; but, if an animal dies more quickly, or is overwhelmed more rapidly by a larger dose, the symptoms as above described are not usually found, but the shock falls most severely upon the lungs.

The lungs in these rapid poisonings are generally distended and engorged with thick black blood. A sufficient time has not elapsed to infiltrate and disorganize the liver, or the muscular tissues, with oil. The hepatic cells with their nuclei are generally seen; but I have seen no case where oil globules were not visible in the structure of the kidneys. Ecchymosed spots vary greatly, both in number, size, and intensity of color.

The most marked differences between the cases that are quickly fatal, and those that linger for a number of days, are in the manner in which the oily material affects the tissues. In the first case, the oil seems to accumulate around and between the tissues, which are distinctly visible, and but slightly altered in appearance: in the latter case the oily material fairly disintegrates the tissues. In the first case, the shock falls upon the lungs, which become congested from accumulation, rather than from inflammation; in the latter case, the vital functions of the organs are slowly interfered with, and disintegration is but the sequence of previous accumulation, and loss of vital energy.

It is not difficult to define the differences between poisoning by phosphorus and other substances, if the kidneys are closely examined.

On reviewing the cases above related we see that the administration of phosphorus in poisonous doses produces peculiar pathological changes. The muscular tissue of one organ, then of another, becomes infiltrated and degenerated with oily substance. This is not in any manner like the accumulation of fat in health, which is

deposited around an organ, and in the tissues connecting them; but this oily degeneration destroys structure, disintegrates cells, and as a consequence vital action is gradually but surely lost. Early in fatal cases the temperature begins to fall, and we find evidences of early degenerative action within the lungs and kidneys. The air-cells of the lungs soon become plastered over with a thick adhesive layer of oil and broken-down blood disks, which prevent the absorption of oxygen, and the proper arterialization of the blood. Even if the air-cells were not plastered over, and arterialization thus prevented, it is doubtful if blood, in the condition that we have described in Experiment 2, could long absorb oxygen in any way that it might be presented to it.

ON THE PHARMACOLOGY AND THERAPEUTICS OF SOME OF THE COMPOUNDS OF PHOSPHORUS ESPECIALLY OF AN ALKALOID HYPOPHOSPHITE.

I propose in this chapter to speak only of some new compounds of phosphorus that I have discovered, and the necessary explanations that will lead to a proper understanding of them. This, of course, must include the pharmacy of such compounds as enter into the composition of those I am about to describe. So far as my studies have led me, I have found no attempts to make phosphorus unite with oleaginous or nitrogenous substances, forming a base of them in the same manner as it forms a base of the alkalies or water. I have slightly adverted, on page 637 and others, to finding by chemical analysis in wheat, in the brain, in the nerves, and in the blood, a peculiar oleaginous and nitrogenous hypophosphite: in several instances, through this work, I have shown that such compounds exist in the human system; they do not exist as any of our laboratory preparations of the phosphates.

With such a knowledge, the question has long forcibly pressed itself upon my mind, to prepare, if possible, in the laboratory an identical hypophosphite to that existing in the brain. Reasoning hypothetically I inferred that such a combination would be more readily absorbed and appropriated in the system. I think I have formed such a compound; and in the following pages I will briefly describe it; and the physiological and therapeutic effects it produces. All of the present preparations of phosphorus frequently disappoint us, and many that are largely given prove to be almost

inert. Every physician feels the need of reliable phosphates; I will give but one quotation from the many I have seen.[1]

On the chemistry of phosphorus, I have spoken fully in the early part of this work; of its methods of manufacture, and the recent improvements in these methods, I would refer to larger works on chemistry.

Phosphorus itself is never used medicinally; it is always administered in some vehicle—most frequently dissolved in some oleaginous substance.

Phosphorus is soluble in most of the fixed oils, but not equally soluble in them.

70 parts of cod-liver oil, of neat's-foot oil, linseed oil, rape-seed oil, sunflower oil, or colza oil, dissolve and retain in solution one part of phosphorus.

78 parts of almond oil and of lard oil retain in solution one part of phosphorus.

80 parts of olive oil or poppy oil retain in solution one part of phosphorus.

105 parts of castor oil retain in solution one part of phosphorus.

The oleum phosphoratum of the Prussian Pharmacopœia is prepared by putting twelve grains of phosphorus into an ounce of almond oil, immersing the bottle in hot water, and agitating until the oil is saturated. Allow this to stand some time, and then pour off the upper portion, leaving the undissolved phosphorus. In this way about four grains of phosphorus are said to be dissolved, whereas, if properly prepared, the oil dissolves about six grains. This is an unscientific method of making what may prove to be a compound of very unequal strength, depending much upon the skill of the person who prepares it. I would propose, as a substitute, the following: Select a good sample of olive oil, almond

[1] "In the treatment of early symptoms of cerebral diseases some preparation of phosphorus is imperatively demanded. It is a well known fact that excessive intellectual exertion increases the quantity of phosphatic salts eliminated from the body, and that, under ordinary circumstances, the amount of phosphoric acid contained in the excretions, other things being equal, indicates the degree in which the mental faculties have been exerted. With the headaches and insomnia, the anæsthesias and partial paralysis of commencing cerebral disease, the quantity of phosphates eliminated will be vastly augmented. The first and most pressing indication for treatment is to supply to the cerebro-spinal axis the important element of which it is being drained, and the prompt exhibition of phosphorus in some eligible form is an urgent necessity."

oil, or lard oil, heat it slowly in a Florence flask or porcelain capsule to 480° F. The heat should be raised gradually, so that half an hour should be consumed before the oil is brought to this temperature. Let it stand till cool, then filter it into a clean, well-dried bottle. Into this bottle add (s. a.) transparent fragments of phosphorus, in the proportion of one grain of phosphorus to every 100 minims of oil. Place the bottle in a bath of water at 180° F., and agitate until dissolved.

Oil prepared in this way is limpid, transparent, and has no deposit; it contains one per cent. of phosphorus. It is phosphorescent, emitting white vapors when exposed to the air; when shaken in the dark it is very luminous. The vapor of ether, olefiant gas, naphtha, or turpentine, immediately stops this phosphorescence.[1]

I have for many years prepared a solid oil of the same strength, so as to make it in the form of pills or capsules. I have prepared it in the following manner:—

Take a quantity of butter of cocoa, and in a porcelain capsule gradually bring it to the temperature of 400° F.; filter while hot through a proper filter kept hot. Cast it into thin sheets that can be easily broken up. Take of this purified butter of cocoa a weighed quantity, melt it over a water bath, and for each one hundred grains add one grain of transparent phosphorus in small pieces: keep it on the water bath till the phosphorus is all dissolved. When almost cold, add one or two drops of naphtha, to deprive it of luminosity. This may either be poured while warm into gelatine capsules, or it may be poured out into shallow dishes. When cold, small pieces may be easily and dexterously worked in a porcelain mortar into pill mass, and quickly rolled out into pills of the desired size. These pills may be coated with collodion, gelatine, or white shellac dissolved in strong alcohol. Each grain contains $\frac{1}{100}$ gr. of phosphorus. If cocoa butter cannot be obtained, mutton suet may supply the place.

I have described these formulæ in detail that the next that I am about to give may be more readily understood. These are nothing but a solution of phosphorus in oil; definite in strength, and purified so that they will keep a long time.

The formulæ I next present are entirely my own, and have not been prepared, as yet, by any other person.

[1] See page 620.

Take of the purified cocoa butter, or of beef tallow prepared in the same manner, 1000 grains; put it into a Wolf's apparatus or a clean wide-mouthed eight ounce vial, to which a cork has been adjusted with two glass tubes, one passing to the bottom of the bottle, and the other terminating near the cork; add one hundred grains of Valentine's beef extract. Put on a water bath, and keep it for some time at 212° F., agitating frequently to mix the beef extract and fat well together. Add eleven grains of phosphorus in small pieces. When the phosphorus is all dissolved, attach an India rubber tube, connected with a reservoir of oxygen gas, under pressure, to the glass tube that leads to the bottom of the bottle. Allow the oxygen to pass slowly through the mass, still keeping it constantly agitated and at 212° F. Continue this till all luminosity has ceased and until all the smell of phosphorus has disappeared. Take it out of the water bath, allow the oxygen to pass slowly through it, occasionally agitating, until the fat begins to become solid: then cork tightly and leave for a few days. Heat again in a water bath, and if any luminosity is visible add pure oxygen. Take out the cork and glass tubes, and continue the heat till all the bubbles of oxygen are driven off. Pour into cakes to be made into pills, or pour into capsules as described on page 654.

The formula just described is for the use of those who prefer to take medicine in the form of pills or capsules. For children, or for those who prefer medicine in a liquid form, or for use in combination with other medicines, I offer the following formula:—

Take of lard oil, purified in the manner before described, 1000 grains, Valentine's beef extract (which is more fluid than any other) one hundred grains; keep in a water bath at 110° F., agitating to mix the beef extract and the oil: add eleven grains of clear phosphorus in small pieces; when all dissolved, bring the temperature to 212° F., and strain; attach the bottle to the oxygen reservoir, and treat it exactly as described in the last formula.

In both of these formulæ, by the addition of the beef extract and the phosphorus to the fatty matter, the color is but little deepened; but on the introduction of the oxygen the color becomes quite brown, and when the process is completed the mass is of quite a dark color. This change is not affected by heat, as heat is used before the introduction of oxygen, but the change in color is owing to a change in the chemical formulæ of the ingredients. The oil is now entirely changed in character; it has lost its albaceous

smell and disagreable taste, it has become less poisonous, and is no longer luminous in the dark.[1]

A substance called oleo-phosphoric acid, or leathine, has been described by chemists as a component part of the brain and nervous system, and they say it is always found in cerebral matter. By others it has been spoken of as the great special stimulant of the brain; a portion of which is consumed in every thought and action, and, without a sufficiency, intelligence and vitality are at their lowest stand-point. Fremy and Quevenne, years ago, described it as the great motor power of the brain, and proved to their own satisfaction its existence in the brain in quantity proportionate to the intelligence of the animal. They stated also that it existed in the fat globules of milk and in the yelk of eggs. All the physiological chemists speak of it, and of the great difficulty of isolating it.

Repeating the experiments of Fremy and Quevenne and Gobley, I find that they made a great error in their analyses. They speak of this phosphoric brain compound as oleo-phosphoric acid, a peculiar fatty acid, not a phosphoric acid. They say "the substance of the brain contains two peculiar fatty acids, one of which contains nitrogen." By their methods of analysis they overlooked a most important combination, and they imperfectly determined the character of the phosphorous compound. I find that this brain hypophosphite is an alkaloid, that it contains nitrogen[2] as a component part of its composition, and that both glycerine and nitrogen form a base to the lower oxide of phosphorus—the hypophosphorous acid.[3]

[1] I have in course of preparation an alkaloid substance somewhat similar to the above, with glycerine and an active nitrogenous principle as the base. I am also extracting the same substance from the brains of fish and from the inner structure of wheat bran.

[2] Fresenius, Quantitative Chemical Analysis, § 140, p. 352.

[3] Hypophosphorous acid instantly reduces permanganic acid even in the cold, by which it is distinguished from phosphorous acid, which requires heat. These two acids are likewise distinguished by the property possessed by the former of first precipitating hydride of copper (CuH) from a solution of sulphate of copper, and, subsequently, by boiling, decomposing the hydride into metallic copper and hydrogen gas.

A Manual of Chemical Analysis, by H. M. Noad, 4th ed., pages 154, 5, 6, 7, 8.

Fresenius, Quantitative Chemical Analysis, § 106, pages 225 to 235; § 157, p. 392.

Rammelsberg has investigated the compounds formed by phosphorous acid with bases with special reference to their water of combination. The salts of Zn, Co Mn, Cd, Pb, Cu, FO_3, and of the alkalies, contain one equivalent of water chemi-

Fremy described the substance he discovered as a compound of three units of olein with one of phosphoric acid, whereas I find the same substance, upon closer examination, to be a combination of three units of blended glycerine and nitrogen with one unit of hypophosphorus acid. This is a true alkaloid substance, and cannot, so far as my experience goes, be changed in any way without undergoing decomposition.

Hypophosphorous acid has not hitherto been found in an anhydrous state, it is always united with three units of water, and its salts retain two units of this water as a base. The hypophosphorous acid, as I have found it in oil, as it becomes nascent, slowly unites with two units of glycerine, which become basic; the other unit is nitrogen: thus it retains its same chemical characteristics.

This alkaloid substance is separated from cerebral matters in combination with other oleaginous compounds. It is soluble in ether and in chemogene, gasoline, etc. It is insoluble in alcohol, is decomposed by heat, and by acids and alkalies. It is insoluble in cold water and is decomposed and rendered saponaceous by boiling water. When separated from other cerebral matters it is a thick, viscid, semi-fluid substance. Heat and acids separate it into olein and phosphuretted hydrogen, liberating the nitrogen; alkalies in solution separate it into olein and acid phosphates, with liberation of the nitrogen.

This alkaloid hypophosphite, as prepared by the directions I have given above, resembles in its chemical composition that obtained by Fremy, Quevenne, and Gobley from the brain. It will be seen that in its preparation it is simply in the first instance phosphorus dissolved in oil, with a nitrogenous substance added. Upon the introduction of oxygen gas, a portion of the phosphorus is converted into anhydrous hypophosphorous acid, each unit of which, at the moment of its formation, while it is in the condition which chemists call nascent, unites with two units of oil and one unit of nitrogen, and forms a new compound, a compound such as would not be formed if hypophosphorous acid in a fluid form was mixed with the oleaginous compound. By continuing the introduction of oxygen, additional portions of hypophosphorous acid are continually formed and unite to generate this new compound until all

cally combined, while those of Ba, Sr, Ca, Mg, and Ni contain two equivalents. The water thus combined cannot again be eliminated as such, as by high temperatures the salts are decomposed without liberation of water.

the phosphorus in the oil is decomposed. This nascent state of the hypophosphite gives it additional capabilities of combination.

When this compound is once formed, it is as stable as any of the other compounds of phosphorus. The neutral phosphates, such as those of iron, lime, potassa, soda, or ammonia, may be mixed with and administered with it.

Although this nitrogenous hypophosphite has been isolated from the brain and nerves, it has, I believe, as yet never been formed in the laboratory, nor has it ever been used as a therapeutic agent. Upon hypothetical grounds alone, we should suppose it to be one of the most easily assimilated of all the preparations of phosphorus, because it most nearly resembles that form of phosphorus which is found to be the most active within the animal economy.

I have succeeded in isolating the nitrogenous hypophosphates existing in wheat, which I would call the organized phosphates.

Proceeding beyond hypothesis I have resorted to experiment, and I will relate the following cases, merely proposing to give a slight outline and to narrate that portion of each case only which pertains to the effects of this medicine. I shall make each case as brief as possible.

EXPERIMENT 11.—I administered to a small dog twenty minims of this alkaloid every four hours during three days. No other symptoms were noticed but an increase in the fulness and frequency of the pulse, and such a playful disposition that it was almost impossible to keep him still.

EXPERIMENT 12.—To another dog were administered fifty minims every four hours—except during the night—until eight doses were taken. The dog was very much excited, the pulse was rapid and full, the eyes congested, and he was very thirsty. Upon the discontinuance of the medicine these effects soon passed over, and he regained his natural state.

EXPERIMENT 13.—To a dog of medium size I administered fifty minims of this alkaloid hypophosphite. The dog had been ailing and dejected; moping around all day in a stupid state, merely opening his eyes when called but not attempting to rise. The same dose was administered every two hours. After taking the second dose the dog became very playful and excited, and, as the medicine was continued, he became almost frantic with play, jump-

ing on the table and chairs, and running around full of the wildest excitement. The pulse was quickened, the eyes were bright and sparkling. Five doses were administered during the day. During the next day the dog ate and drank well, seemed to be in perfect health, and was very playful. At 6 o'clock P.M. five hundred minims were given at one dose. The next morning the dog was dead. The liver and heart were softer than natural and slightly infiltrated with oil. The kidneys were greatly enlarged, soft, flabby and degenerated with oily infiltration: they were nearly double the natural size. There were no ecchymosed spots.

Case.—A gentleman called on me, telling me that for fourteen months he had been troubled with a constant succession of small but very painful boils; that he had been under steady medical treatment for them with no benefit; that his appetite was poor, and his aversion for several kinds of food very great; that he had gastric irritability. I gave him five minims of alkaloid hypophosphite in a teaspoonful of olive oil with each meal, with no other medicine. From that time—more than a year ago—he has had no boils. He continued the medicine about a month; his appetite and general health and spirits are restored.

Case.—This gentleman sent me another who for eight months had a constant succession of boils on the neck. They were so inconvenient and so irritative that he had been successively under the care of three physicians. As he was not at home in the daytime, I gave him ten minims night and morning in a teaspoonful of olive oil. This perfectly cured him, and he has had none since.

Case.—A young man sent for me having the irritative cough of phthisis: it was so constant as to allow him but little sleep. I gave him five minims of the alkaloid in a wineglassful of warm milk every four hours. In two days he was so much relieved that he "did not cough once an hour."

Case.—A lady nursing her child, æt. five months, sent for me complaining of aching pains in the back and chest, frequent nausea, dimness of vision, a dragging pain in the nipples after nursing, and gentral prostration. The child was ravenous, irritable, sleepless, and exceedingly troublesome.

To the mother I gave five minims in a little of Borden's beef

extract every four hours, and at night-time the same dose in oat-meal and milk. To the child I gave two minims in a little warm milk every four hours. The improvement in health, spirits, and appearance was rapid and permanent.

Case.—A young lady æt. 18 suffered severely while in the country from intermittent fever, and in consequence lost her rotundity and good looks, and when I saw her was complaining of palpitation, short breathing, nausea, giddiness, loss of appetite, and other symptoms. I gave her five minims of this alkaloid in a wineglassful of warm sweetened milk every four hours. She continued taking this for a month, towards the last at longer intervals. At the expiration of the month she called upon me. She looked bright and beautiful, and she said she "felt as well as she looked."

Case.—"A lone, lorn old maid" was anæmic from excessive menstrual flow, which caused profuse leucorrhœa for a week or ten days after each period; she was sleepless, pale, with all the nervous disorders that accompany such a state of disease. I gave her five minims of alkaloid in a wineglassful of warm sweetened milk three times a day. A daily improvement was seen in her health, and in a few months she was perfectly well.

I could give numbers of other cases, but the brief description I have given of these seems to me to be sufficient. In all these cases this medicine has been given alone, not in combination with others.

PLAN OF ORGANIZATION

FOR A

NATIONAL MEDICAL ASSOCIATION.

PLAN OF ORGANIZATION

FOR A

NATIONAL MEDICAL ASSOCIATION.

Whereas, The Medical Convention, held in the city of New York, in May, 1846, have declared it expedient "for the medical profession of the United States to institute a National Medical Association;" and,

Inasmuch as an institution so conducted as to give frequent, united, and emphatic expression to the views and aims of the medical profession in this country, must, at all times, have a beneficial influence, and supply more efficient means than have hitherto been available here for cultivating and advancing medical knowledge; for elevating the standard of medical education; for promoting the usefulness, honor, and interests of the medical profession; for enlightening and directing public opinion in regard to the duties, responsibilities, and requirements of medical men; for exciting and encouraging emulation and concert of action in the profession, and for facilitating and fostering friendly intercourse between those who are engaged in it: therefore,

Be it resolved, In behalf of the medical profession of the United States—that the members of the Medical Convention, held in Philadelphia, in May, 1847, and all others who, in pursuit of the objects above mentioned, are to unite with, or succeed them, constitute a National Medical Association; and that, for the organization and management of the same, they adopt the following *Regulations*:—

I.—TITLE OF THE ASSOCIATION.

This institution shall be known and distinguished by the name and title of "The American Medical Association."

II.—MEMBERS.

The members of this institution shall collectively represent and have cognizance of the common interests of the medical profession in every part of the United States; and shall hold their appointment to membership either as delegates from local institutions, as members by invitation, or as permanent members.

The *Delegates* shall receive their appointment from permanently organized medical societies, medical colleges, hospitals, lunatic asylums, and other permanently organized medical institutions of good standing in the United States, from the army and navy, and from the American Medical Society of Paris.

Each delegate shall hold his appointment for one year, and until another is appointed to succeed him, and shall participate in all the business and affairs of the Association.

Each local society shall have the privilege of sending to the Association one delegate for every ten of its regular resident members, and one for every additional fraction of more than half this number. The faculty of every regularly constituted medical college or chartered school of medicine shall have the privilege of sending two delegates. The professional staff of every chartered or municipal hospital, containing a hundred inmates or more, shall have the privilege of sending two delegates; and every other permanently organized medical institution of good standing shall have the privilege of sending one delegate.

No individual who shall be under sentence of expulsion or suspension from any State or local medical society of which he may have been a member, or whose name shall have been, for non-payment of dues, dropped from the rolls of the same, shall be received as a delegate to this Association, or be allowed any of the privileges of a member, until he shall have been relieved from the said sentence or disability by such State or local society, or shall have paid up all arrears of membership; nor shall any person not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the American Medical Association.

No one expelled from this Association shall at any time thereafter be received as a delegate or member, unless by a three-fourths vote of the members present at the meeting to which he is sent, or at which he is proposed.

Members by Invitation shall consist of practitioners of reputable

standing from sections of the United States not otherwise represented at the meeting. They shall receive their appointment by invitation of the meeting, after an introduction from, and being vouched for by, at least three of the members present, or three of the absent permanent members. They shall hold their connection with the Association until the close of the annual session at which they are received; and shall be entitled to participate in all its affairs, as in the case of delegates, except the right to vote.

The *Permanent Members* shall consist of all those who have served in the capacity of delegates, and of such other members as may receive the appointment by unanimous vote, and shall continue such so long as they remain in good standing in the body from which they were sent as delegates, and comply with the requirements of the By-laws of the Association. Permanent members shall at all times be entitled to attend the meetings, and participate in the affairs of the Association, so long as they shall continue to conform to its regulations, but without the right of voting; and, when not in attendance, they shall be authorized to grant letters of introduction to reputable practitioners of medicine residing in their vicinity, who may wish to participate in the business of the meeting, as provided for members by invitation.

Every member elect, prior to the permanent organization of the annual meeting, or before voting on any question after the meeting has been organized, must exhibit his credentials to the proper committee, and sign these regulations, inscribing his name and address in full, specifying in what capacity he attends, and, if a delegate, the title of the institution from which he has received his appointment.

III.—MEETINGS.

The regular meetings of the Association shall be held annually, and commence on the first Tuesday in May or first Tuesday in June. The place of meeting shall be determined, with the time of meeting for each next successive year, by vote of the Association.

IV.—OFFICERS.

The officers of the Association shall be a President, four Vice-Presidents, one Permanent and one Assistant Secretary, a Treasurer and Librarian. They shall be nominated by a special committee of one member from each State represented at the meeting, and shall be elected by vote on a general ticket.

Each officer, except the Permanent Secretary, shall hold his

appointment for one year, and until another is elected to succeed him. The Permanent Secretary shall hold his appointment until removed by death, resignation, or a vote of two-thirds of the members present at a regular annual meeting.

The President and Vice-Presidents shall assume the functions of their respective offices at the beginning of the annual meeting next succeeding their election; all other officers shall enter upon their duties immediately after their election.

The President shall preside at the meetings, preserve order and decorum in debate, give a casting vote when necessary, and perform all the other duties that custom and parliamentary usage may require.

The Vice-Presidents, when called upon, shall assist the President in the performance of his duties, and during the absence, or at the request of the President, one of them shall officiate in his place.

The Permanent Secretary shall record the minutes and authenticate the proceedings; give due notice of the time and place of each next ensuing annual meeting; notify all members of committees of their appointment, and of the duties assigned to them; hold correspondence with other permanently organized medical societies, both domestic and foreign; serve as a member of the Committee of Publication; see that the published *Transactions* are promptly distributed to all the members who have paid the annual assessment, and carefully preserve the archives and unpublished transactions of the Association.

The Assistant Secretary shall aid the Permanent Secretary in recording and authenticating the proceedings of the Association; serve as a member of the Committee of Arrangements, and perform all the duties of Permanent Secretary temporarily, whenever that office shall be vacant, either by death, resignation, or removal.

The Treasurer shall have the immediate charge and management of the funds and property of the Association. He shall be a member of the Committee of Publication, to which committee he shall give bonds for the safe keeping and proper use and disposal of his trust. And through the same committee he shall present his accounts, duly authenticated, at every regular meeting.

The Librarian shall receive and preserve all the property in books, pamphlets, journals, and manuscripts presented to or acquired by the Association, record their titles in a book prepared for the purpose, acknowledge the receipt of the same, and he shall be a member of the Committee of Publication.

V.—STANDING COMMITTEES.

The following standing committees, each composed of seven members, shall be organized at every annual meeting, for preparing, arranging, and expediting business for each next ensuing year, and for carrying into effect the orders of the Association not otherwise assigned, namely, a Committee of Arrangements and a Committee of Publication.

The Committee of Arrangements shall, if no sufficient reasons prevent, be mainly composed of seven members, of whom the Assistant Secretary shall be one, residing in the place at which the Association is to hold its next annual meeting; and shall be required to provide suitable accommodations for the meeting, to verify and report upon the credentials of membership, to receive and announce all essays and memoirs voluntarily communicated, either by members of the Association, or by others through them, and to determine the order in which such papers are to be read and considered.

The Committee of Publication, of which the Secretaries, Treasurer, and Librarian, must constitute a part, shall have charge of preparing for the press, and of publishing and distributing such of the proceedings, transactions, and memoirs of the Association as may be ordered to be published. The six members of this Committee, who have not the immediate management of the funds, shall also, in their own names as agents for the Association, hold the bond of the Treasurer for the faithful execution of his office, and shall annually audit and authenticate his accounts, and present a statement of the same in the annual report of the Committee; which report shall specify the character and cost of the publications of the Association during the year, the number of copies still at the disposal of the meeting, the funds on hand for further operations, and the probable amount of the assessment to be laid on each member of the Association for covering its annual expenditures.

VI.—FUNDS AND APPROPRIATIONS.

Funds shall be raised by the Association for meeting its current expenses and awards from year to year, but never with the view of creating a permanent income from investments. Funds may be obtained by an equal assessment of not more than five dollars annually, on each of the delegates and permanent members; by voluntary contributions for specific objects; and by the sale and disposal of publications, or of works prepared for publication.

The funds may be appropriated for defraying the expenses of the annual meetings, including the necessary expenses of the Permanent Secretary in maintaining the necessary correspondence of the Association; for publishing the proceedings, memoirs, and transactions of the Association; for enabling the Standing Committees to fulfil their respective duties, conduct their correspondence, and procure the materials necessary for the completion of their stated annual reports; for the encouragement of scientific investigation by prizes and awards of merit; and for defraying the expenses incidental to specific investigations under the instruction of the Association, where such investigations have been accompanied with an order on the Treasurer to supply the funds necessary for carrying them into effect.

VII.—PROVISION FOR AMENDMENT.

No amendment or alteration shall be made in any of these articles, except at the annual meeting next subsequent to that at which such amendment or alteration may have been proposed; and then only by the voice of three-fourths of all the delegates in attendance.

Provided, however, that when an amendment is properly under consideration, and an amendment is offered thereto, germain to the subject, it shall be in order, and if adopted, shall have the same standing and force as if proposed at the preceding meeting of the Association.

And, in acknowledgment of having adopted the foregoing propositions, and of our willingness to abide by them, and use our endeavors to carry into effect the objects of this Association as above set forth, we have hereunto affixed our names.

NAMES OF MEMBERS.	RESIDENCE.	INSTITUTION REPRESENTED.

BY-LAWS.

I.—ORDER OF BUSINESS.

The order of business at the annual meetings of the American Medical Association shall at all times be subject to the vote of three-fourths of all the members in attendance; and, until permanently altered, except when for a time suspended, it shall be as follows, viz:—

1st. The calling of the meeting to order by the President elected the preceding year, or, in his absence, by one of the Vice-Presidents.

2d. The report of the Committee of Arrangements on the credentials of members, after the latter have registered their names and addresses, and the titles of the institutions which they represent.

3d. The reception of members by invitation.

4th. The election of permanent members.

5th. The reading of notes from absentees.

6th. The hearing of the annual address of the President.

7th. The reception of the reports of all special committees and voluntary communications, and their reference to the appropriate Sections.

8th. The appointment of the committee of one from each State represented, to nominate officers of the Association, and to fill the standing committees.

9th. The reading and consideration of the reports of the Standing Committees of Publication; on Medical Education; on Medical Literature; and on Prize Essays.

10th. Resolutions introducing new business, and instructions to the permanent committees.

11th. The selection of the next place of meeting.

12th. The report of the Nominating Committee, and the election of officers of the Association.

13th. Reports from the several Sections.

14th. Reading of the minutes by the Secretary.

15th. Unfinished and miscellaneous business.

16th. Adjournment.

II.—SECTIONS.

The general meetings of the Association shall be restricted to the morning sessions; and the afternoon sessions, commencing at three o'clock, shall be devoted to the hearing of reports and papers and their consideration, in the following *Sections*:—

1. Chemistry and Materia Medica.
2. Practical Medicine and Obstetrics.
3. Surgery and Anatomy.
4. Meteorology, Medical Topography, and Epidemic Diseases.
5. Medical Jurisprudence, Hygiene, and Physiology.
6. Psychology.

The chairman and secretary of the several sections shall, like other officers of the Association, be nominated by the special committee of one member from each State represented at the meeting, and elected by a vote on a general ticket. They shall hold their office until the close of the proper business of the annual meeting next succeeding their election, and until their successors are appointed.

Papers appropriate to the several sections, in order to secure consideration and action, must be sent to the Secretary of the appropriate section at least one month before the meeting which is to act upon them. It shall be the duty of the Secretary to whom such papers are sent, to examine them with care, and, with the advice of the Chairman of his Section, to determine the time and order of their presentation, and give due notice of the same; and, after their full examination and discussion by the Section, they shall be sent to the Permanent Secretary of the Association.

All papers presented directly to the Association, and other matters, may, at the discretion of the Association, be referred to the various sections for their consideration and report.

III.—STANDING COMMITTEES.

The following are the Standing Committees of the Association, to be filled by the Committee on Nominations, and to report at the next annual meeting subsequent to their appointment, viz: Committee of Arrangements; Committee of Publication; Committee on Prize Essays; Committee on Medical Education; Committee on Medical Literature; Committee on Climatology and Epidemic Diseases; and Committee on American Medical Necrology.

The *Committee of Publication* shall append to each volume of the *Transactions* hereafter published, a copy of the Constitution, By-Laws, and Code of Ethics of the Association. It shall print conspicuously, at the beginning of each volume of the *Transactions*, the following disclaimer, viz: The American Medical Association, although formally accepting and publishing the reports of the various standing committees, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution.

The *Committee on Prize Essays* shall consist of five members, residing in the same neighborhood, whose duty it shall be, in the interval between the present and the next succeeding annual sessions, to receive original papers upon any medical subject, from any persons who may choose to send them; to decide upon the merits of these papers, and to select for presentation to the Association, at its next session, such as they may deem worthy of being thus presented. The Committee shall have power to form such regulations as to the mode in which the papers are to be presented, and as to the observing of secrecy, as they may think proper; and also to award two prizes of one hundred dollars each, to the best two original communications reported on favorably by them, and directed by the Association to be published.

The *Committees on Medical Education* and *Medical Literature* shall consist of five members each, to be appointed annually.

The *Committee on Climatology* and *Epidemic Diseases* shall consist of one member for each State and Territory represented in the Association, whose duty it shall be to report upon its medical topography, epidemic diseases, and the most successful treatment thereof, and the same shall continue to hold their office for three years.

The *Committee on American Medical Necrology* shall consist of one member for each State and Territory represented in the Association, whose duty it shall be to procure memorials of the eminent and worthy dead among the distinguished physicians of their respective States and Territories, and transmit them to the chairman of this committee on or before the first of April of each and every year.

IV.—THE PUBLICATION OF PAPERS AND REPORTS.

No report or other paper shall be entitled to publication in the volume for the year in which it shall be presented to the Association,

unless it be placed in the hands of the Committee of Publication on or before the first day of July. It must also be so prepared as to require no material alteration or addition at the hands of its author.

Authors of papers are required to return their proofs within two weeks after their reception; otherwise they will be passed over and omitted from the volume.

Every paper received by this Association and ordered to be published, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published and sold for the exclusive benefit of the Association.

V.—ASSESSMENTS.

The sum of five dollars shall be assessed, annually, upon each delegate to the sessions of the Association, as well as upon each of its permanent members, whether attending or not, for the purpose of raising a fund to defray necessary expenses. The payment of this sum shall be required of the delegates and members in attendance upon the sessions of the Association previously to their taking their seats and participating in the business of the sessions. Permanent members, not in attendance, shall transmit their dues to the Treasurer.

Any permanent member who shall fail to pay his annual dues for three successive years, unless absent from the country, shall be dropped from the roll of permanent members, after having been notified by the Secretary of the forfeiture of his membership.

VI.—DELEGATES FROM THE MEDICAL STAFFS OF THE ARMY AND NAVY.

Delegates representing the medical staffs of the United States Army and Navy, shall be appointed by the Chiefs of the Army and Navy Medical Bureaus. The number of delegates so appointed shall be four from the army medical officers, and an equal number from the navy medical officers.

VII.—DELEGATES TO FOREIGN MEDICAL SOCIETIES.

The President shall be authorized annually to appoint delegates to represent this Association at the meetings of the British Medical Association, the American Medical Society at Paris, and such other scientific bodies in Europe or other foreign countries as may be affiliated with us.

VIII.—DUTIES OF MEMBERS.

No one shall be permitted to address the Association, except he shall have first given his name and residence, which shall be distinctly announced from the chair, and the member may be required to go forward and speak from the stand, but not more than ten minutes at one time.

No one appointed on a special committee, who fails to report at the meeting next succeeding the one at which he is appointed, shall be continued on such committee, or appointed on any other, unless a satisfactory excuse is offered.

It shall be the duty of every member of this Association, who learns that any existing medical school departs from the published conditions of graduation, to report the fact at the annual meetings; and, on proof of the fact, such school shall be deprived of its representation in this body.

IX.—CONDITION EXCLUDING REPRESENTATION.

No State or Local Medical Society, or other organized institution, shall be entitled to representation in this Association that has not adopted its Code of Ethics; or that has intentionally violated or disregarded any article or clause of the same.

This Association recognizes as a "regular organized" medical college one that has been represented at any meeting, and that complies with the rules and directions found in the published *Transactions*, vol. xiii. page 33.

X.—OF THE PREVIOUS QUESTION.

When the previous question is demanded, it shall take at least twenty members to second it; and when the main question is put under force of the previous question and negatived, the question shall remain under consideration the same as if the previous question had not been enforced.

ORDINANCES.

Resolved, That the several Sections of this Association be requested, in the future, to refer no papers or reports to the Committee of Publication, except such as can be fairly classed under one of the three following heads, viz: 1st. Such as may contain and establish *positively* new facts, modes of practice, or principles of real value. 2d. Such as may contain the results of well-devised original experimental researches. 3d. Such as present so complete a review of the facts on any particular subject as to enable the writer to deduce therefrom legitimate conclusions of importance.

Resolved, That the several sections be requested, in the future, to refer all such papers as may be presented to them for examination by this Association, that contain matter of more or less value, and yet cannot be fairly ranked under either of the heads mentioned in the foregoing resolution, back to their authors with the recommendation that they be published in such regular medical periodicals as said authors may select, with the privilege of placing at the head of such papers, "Read to the Section of the American Medical Association on the day of 18 ." (Vide *Transactions*, vol. xvi. p. 40.)

Resolved, That the Association shall send annually a delegate to the "Association of Medical Superintendents of Insane Asylums," one of whose duties it shall be to urge upon that Association the advantage, for all purposes of science, of a more intimate union with this Association. (Vide *Transactions*, vol. xvi. p. 41.)

Resolved, That, instead of yearly reprinting the list of members of the American Medical Association, the Committee of Publication be instructed to prepare and print in the *Transactions* an alphabetical catalogue triennially, containing a complete list of the Permanent Members, with their names in full, designating their residences, the year of their admission, the offices they may have held in the Association, and, in case of death or rejection, the date thereof. (Vide *Transactions*, vol. xvii. p. 33.)

Resolved, That no report or other paper shall be presented to this Association unless it be so prepared that it can be put at once into the hands of the Permanent Secretary, to be transmitted to the Committee of Publication. (Vide *Transactions*, vol. xvii. p. 27.)

Resolved, That the Permanent Secretary hereafter and from this date be authorized to draw a warrant upon the Treasurer for the

expenses incurred in his attendance upon each session of the Association, and that the Treasurer is hereby instructed to pay the same. (Vide *Transactions*, vol. xviii. p. 42.)

Resolved, That the faculties of the several medical colleges of the United States be recommended to announce explicitly in their annual commencement circulars and advertisements that they will not receive certificates of time of study from irregular practitioners, and that they will not confer the degree upon any one who may acknowledge his intention to practise in accordance with any exclusive system. (Vide *Transactions*, vol. xix. p. 31.)

Resolved, That there be added to the Committee of Arrangements a Sub-Committee of Arrangements in each of our large cities, consisting of three members, whose duty it shall be to obtain, if practicable, a reduction of fare upon the routes of travel for the delegates from their city and vicinity who attend the meeting of the Association.

On motion, the Permanent Secretary was empowered to make the appointments on said committees. (Vide *Transactions*, vol. xix. p. 39.)

Resolved, That a standing committee of one be appointed upon the whole subject of vaccination, to report from time to time on such topics connected with it as shall, in the estimation of said committee, appear of chief practical interest and importance to the profession. (Vide *Transactions*, vol. xix. p. 40.)

Resolved, That those gentlemen who desire to report on special subjects, and will pledge themselves to report at the next meeting, be requested to send their names, and the subjects on which they desire to report, to the Permanent Secretary. (Vide *Transactions*, vol. xix. p. 42.)

Resolved, That hereafter the necessary expenses for rent of hall for general meetings and rooms for sections to accommodate the annual meetings, and the necessary expenses for cards of membership, be paid out of the treasury of the Association. (Vide *Transactions*, vol. xix. p. 42.)

Resolved, That each State Medical Society be requested to prepare an annual register of all the regular practitioners of medicine in their respective States, giving the names of the colleges in which they may have graduated, and date of diploma or license. (Vide *Transactions*, vol. xx. p. 20.)

Resolved, That this Association recognizes specialties as proper and legitimate fields of practice.

Resolved, That specialists shall be governed by the same rules of professional etiquette as have been laid down for general practitioners.

Resolved, That it shall not be proper for specialists publicly to advertise themselves such, or to assume any title not specially granted by a regularly chartered college.

Resolved, That private handbills addressed to members of the medical profession, or by cards in medical journals, calling the attention of professional brethren to themselves as specialists, be declared in violation of the Code of Ethics of the American Medical Association. (Vide *Transactions*, vol. xx. p. 28.)

Resolved, That a Committee of one be appointed, residing at Washington, to render the Librarian of Congress such assistance as the interests of the Association may require. (Vide *Transactions*, vol. xx. p. 29.)

Whereas, The proper construction of Art. IV., Sec. 1, Code of Ethics, A. M. A., having been called for, relative to consultation with irregular practitioners who are graduates of regular schools:

Resolved, That said Art. IV., Sect. 1, Code of Ethics, excludes all such practitioners from recognition by the regular profession. (Vide *Transactions*, vol. xx. p. 30.)

Whereas, The contract system is contrary to medical ethics:

Resolved, That all contract physicians, as well as those guilty of bidding for practice at less rates than those established by a majority of regular graduates of the same locality, be classed as irregular practitioners. (Vide *Transactions*, vol. xx. p. 41.)

Resolved, That if any member fail to reply for more than one year to the circular sent to him by the Committee of Publication, he shall forfeit his right to the volume, and it shall revert to the Association, to be sold to any applicant at the current rates. (Vide *Transactions*, vol. xxi. p. 80.)

Resolved, That the Committee of Arrangements for the next ensuing meeting of this Association, and for all meetings thereafter, be directed to prepare a list of members present on a separate roll, for convenience and accuracy in calling the ayes and nays when the same shall be demanded. (Vide *Transactions*, vol. xxi. p. 60.)

Resolved, That all questions of a personal character, including complaints and protests, and all questions on credentials, be referred at once, after the report of the Committee of Arrangements or other presentation, to the Committee on Ethics, and without discussion. (Vide *Transactions*, vol. xxiii. pp. 33 and 71.)

CODE OF ETHICS

OF THE

AMERICAN MEDICAL ASSOCIATION,

ADOPTED MAY, 1847.

CODE OF MEDICAL ETHICS.

OF THE DUTIES OF PHYSICIANS TO THEIR PATIENTS, AND OF THE OBLIGATIONS OF PATIENTS TO THEIR PHYSICIANS.

ART. I.—*Duties of physicians to their patients.*

§ 1. A physician should not only be ever ready to obey the calls of the sick, but his mind ought also to be imbued with the greatness of his mission, and the responsibility he habitually incurs in its discharge. These obligations are the more deep and enduring, because there is no tribunal other than his own conscience to adjudge penalties for carelessness or neglect. Physicians should, therefore, minister to the sick with due impressions of the importance of their office; reflecting that the ease, the health, and the lives of those committed to their charge, depend on their skill, attention, and fidelity. They should study, also, in their deportment, so to unite *tenderness* with *firmness*, and *condescension* with *authority*, as to inspire the minds of their patients with gratitude, respect, and confidence.

§ 2. Every case committed to the charge of a physician should be treated with attention, steadiness, and humanity. Reasonable indulgence should be granted to the mental imbecility and caprices of the sick. Secrecy and delicacy, when required by peculiar circumstances, should be strictly observed; and the familiar and confidential intercourse to which physicians are admitted in their professional visits, should be used with discretion, and with the most scrupulous regard to fidelity and honor. The obligation of secrecy extends beyond the period of professional services;—none of the privacies of personal and domestic life, no infirmity of disposition or flaw of character observed during professional attendance should ever be divulged by the physician except when he is imperatively required to do so. The force and necessity of this obligation are indeed so great, that professional men have, under

certain circumstances, been protected in their observance of secrecy by courts of justice.

§ 3. Frequent visits to the sick are in general requisite, since they enable the physician to arrive at a more perfect knowledge of the disease—to meet promptly every change which may occur and also tend to preserve the confidence of the patient. But unnecessary visits are to be avoided, as they give useless anxiety to the patient, tend to diminish the authority of the physician, and render him liable to be suspected of interested motives.

§ 4. A physician should not be forward to make gloomy prognostications, because they savor of empiricism, by magnifying the importance of his services in the treatment or cure of the disease. But he should not fail, on proper occasions, to give to the friends of the patient timely notice of danger when it really occurs; and even to the patient himself, if absolutely necessary. This office, however, is so peculiarly alarming when executed by him, that it ought to be declined whenever it can be assigned to any other person of sufficient judgment and delicacy. For the physician should be the minister of hope and comfort to the sick; that, by such cordials to the drooping spirit, he may smooth the bed of death, revive expiring life, and counteract the depressing influence of those maladies which often disturb the tranquillity of the most resigned in their last moments. The life of a sick person can be shortened not only by the acts, but also by the words or the manner of a physician. It is, therefore, a sacred duty to guard himself carefully in this respect, and to avoid all things which have a tendency to discourage the patient and to depress his spirits.

§ 5. A physician ought not to abandon a patient because the case is deemed incurable; for his attendance may continue to be highly useful to the patient, and comforting to the relatives around him, even in the last period of a fatal malady, by alleviating pain and other symptoms, and by soothing mental anguish. To decline attendance, under such circumstances, would be sacrificing to fanciful delicacy and mistaken liberality, that moral duty, which is independent of, and far superior to, all pecuniary consideration.

§ 6. Consultations should be promoted in difficult or protracted cases, as they give rise to confidence, energy, and more enlarged views in practice.

§ 7. The opportunity which a physician not unfrequently enjoys of promoting and strengthening the good resolutions of his patients, suffering under the consequences of vicious conduct, ought never

to be neglected. His counsels, or even remonstrances, will give satisfaction, not offence, if they be proffered with politeness, and evince a genuine love of virtue, accompanied by a sincere interest in the welfare of the person to whom they are addressed.

ART. II.—*Obligations of patients to their physicians.*

§ 1. The members of the medical profession, upon whom is enjoined the performance of so many important and arduous duties towards the community, and who are required to make so many sacrifices of comfort, ease, and health, for the welfare of those who avail themselves of their services, certainly have a right to expect and require, that their patients should entertain a just sense of the duties which they owe to their medical attendants.

§ 2. The first duty of a patient is to select as his medical adviser one who has received a regular professional education. In no trade or occupation do mankind rely on the skill of an untaught artist; and in medicine, confessedly the most difficult and intricate of the sciences, the world ought not to suppose that knowledge is intuitive.

§ 3. Patients should prefer a physician whose habits of life are regular, and who is not devoted to company, pleasure, or to any pursuit incompatible with his professional obligations. A patient should, also, confide the care of himself and family, as much as possible, to one physician; for a medical man who has become acquainted with the peculiarities of constitution, habits, and predispositions of those he attends, is more likely to be successful in his treatment than one who does not possess that knowledge.

A patient who has thus selected his physician should always apply for advice in what may appear to him trivial cases, for the most fatal results often supervene on the slightest accidents. It is of still more importance that he should apply for assistance in the forming stage of violent diseases; it is to a neglect of this precept that medicine owes much of the uncertainty and imperfection with which it has been reproached.

§ 4. Patients should faithfully and unreservedly communicate to their physician the supposed cause of their disease. This is the more important, as many diseases of a mental origin simulate those depending on external causes, and yet are only to be cured by ministering to the mind diseased. A patient should never be afraid of thus making his physician his friend and adviser; he

should always bear in mind that a medical man is under the strongest obligations of secrecy. Even the female sex should never allow feelings of shame or delicacy to prevent their disclosing the seat, symptoms, and causes of complaints peculiar to them. However commendable a modest reserve may be in the common occurrences of life, its strict observance in medicine is often attended with the most serious consequences, and a patient may sink under a painful and loathsome disease, which might have been readily prevented had timely intimation been given to the physician.

§ 5. A patient should never weary his physician with a tedious detail of events or matters not appertaining to his disease. Even as relates to his actual symptoms, he will convey much more real information by giving clear answers to interrogatories, than by the most minute account of his own framing. Neither should he obtrude upon his physician the details of his business nor the history of his family concerns.

§ 6. The obedience of a patient to the prescriptions of his physician should be prompt and implicit. He should never permit his own crude opinions as to their fitness to influence his attention to them. A failure in one particular may render an otherwise judicious treatment dangerous, and even fatal. This remark is equally applicable to diet, drink, and exercise. As patients become convalescent, they are very apt to suppose that the rules prescribed for them may be disregarded, and the consequence, but too often, is a relapse. Patients should never allow themselves to be persuaded to take any medicine whatever, that may be recommended to them by the self-constituted doctors and doctresses who are so frequently met with, and who pretend to possess infallible remedies for the cure of every disease. However simple some of their prescriptions may appear to be, it often happens that they are productive of much mischief, and in all cases they are injurious, by contravening the plan of treatment adopted by the physician.

§ 7. A patient should, if possible, avoid even the *friendly visits of a physician* who is not attending him—and when he does receive them, he should never converse on the subject of his disease, as an observation may be made, without any intention of interference, which may destroy his confidence in the course he is pursuing, and induce him to neglect the directions prescribed to him. A patient should never send for a consulting physician without the express consent of his own medical attendant. It is of great importance that physicians should act in concert; for, although their modes

of treatment may be attended with equal success when employed singly, yet conjointly they are very likely to be productive of disastrous results.

§ 8. When a patient wishes to dismiss his physician, justice and common courtesy require that he should declare his reasons for so doing.

§ 9. Patients should always, when practicable, send for their physician in the morning, before his usual hour of going out; for, by being early aware of the visits he has to pay during the day, the physician is able to apportion his time in such a manner as to prevent an interference of engagements. Patients should also avoid calling on their medical advisers unnecessarily during the hours devoted to meals or sleep. They should always be in readiness to receive the visits of their physician, as the detention of a few minutes is often of serious inconvenience to him.

§ 10. A patient should, after his recovery, entertain a just and enduring sense of the value of the services rendered him by his physician; for these are of such a character, that no mere pecuniary acknowledgment can repay or cancel them.

OF THE DUTIES OF PHYSICIANS TO EACH OTHER, AND TO THE PROFESSION AT LARGE.

ART. I.—*Duties for the support of professional character.*

§ 1. Every individual, on entering the profession, as he becomes thereby entitled to all its privileges and immunities, incurs an obligation to exert his best abilities to maintain its dignity and honor, to exalt its standing, and to extend the bounds of its usefulness. He should, therefore, observe strictly such laws as are instituted for the government of its members;—should avoid all contumelious and sarcastic remarks relative to the faculty as a body; and while, by unwearied diligence, he resorts to every honorable means of enriching the science, he should entertain a due respect for his seniors, who have, by their labors, brought it to the elevated condition in which he finds it.

§ 2. There is no profession, from the members of which greater purity of character, and a higher standard of moral excellence are required, than the medical; and to attain such eminence is a duty every physician owes alike to his profession and to his patients. It is due to the latter, as without it he cannot command their respect and confidence, and to both, because no scientific attainments can

compensate for the want of correct moral principles. It is also incumbent upon the faculty to be temperate in all things, for the practice of physic requires the unremitting exercise of a clear and vigorous understanding; and, on emergencies, for which no professional man should be unprepared, a steady hand, an acute eye, and an unclouded head may be essential to the well-being, and even to the life, of a fellow-creature.

§ 3. It is derogatory to the dignity of the profession to resort to public advertisements, or private cards, or handbills, inviting the attention of individuals affected with particular diseases—publicly offering advice and medicine to the poor gratis, or promising radical cures; or to publish cases and operations in the daily prints, or suffer such publications to be made; to invite laymen to be present at operations, to boast of cures and remedies, to adduce certificates of skill and success, or to perform any other similar acts. These are the ordinary practices of empirics, and are highly reprehensible in a regular physician.

§ 4. Equally derogatory to professional character is it for a physician to hold a patent for any surgical instrument or medicine; or to dispense a secret *nostrum*, whether it be the composition or exclusive property of himself or of others. For, if such nostrum be of real efficacy, any concealment regarding it is inconsistent with beneficence and professional liberality; and if mystery alone give it value and importance, such craft implies either disgraceful ignorance or fraudulent avarice. It is also reprehensible for physicians to give certificates attesting the efficacy of patent or secret medicines, or in any way to promote the use of them.

ART. II.—*Professional services of physicians to each other.*

§ 1. All practitioners of medicine, their wives, and their children while under the paternal care, are entitled to the gratuitous services of any one or more of the faculty residing near them, whose assistance may be desired. A physician afflicted with disease is usually an incompetent judge of his own case; and the natural anxiety and solicitude which he experiences at the sickness of a wife, a child, or any one who, by the ties of consanguinity, is rendered peculiarly dear to him, tend to obscure his judgment, and produce timidity and irresolution in his practice. Under such circumstances, medical men are peculiarly dependent upon each other, and kind offices and professional aid should always be cheerfully

and gratuitously afforded. Visits ought not, however, to be obtruded officiously; as such unasked civility may give rise to embarrassment, or interfere with that choice on which confidence depends. But, if a distant member of the faculty, whose circumstances are affluent, request attendance, and an honorarium be offered, it should not be declined; for no pecuniary obligation ought to be imposed, which the party receiving it would wish not to incur.

ART. III.—*Of the duties of physicians as respects vicarious offices.*

§ 1. The affairs of life, the pursuit of health, and the various accidents and contingencies to which a medical man is peculiarly exposed, sometimes require him temporarily to withdraw from his duties to his patients, and to request some of his professional brethren to officiate for him. Compliance with this request is an act of courtesy, which should always be performed with the utmost consideration for the interest and character of the family physician, and when exercised for a short period, all the pecuniary obligations for such service should be awarded to him. But if a member of the profession neglect his business in quest of pleasure and amusement, he cannot be considered as entitled to the advantages of the frequent and long-continued exercise of this fraternal courtesy, without awarding to the physician who officiates, the fees arising from the discharge of his professional duties.

In obstetrical and important surgical cases, which give rise to unusual fatigue, anxiety, and responsibility, it is just that the fees accruing therefrom should be awarded to the physician who officiates.

ART. IV.—*Of the duties of physicians in regard to consultations.*

§ 1. A regular medical education furnishes the only presumptive evidence of professional abilities and acquirements, and ought to be the only acknowledged right of an individual to the exercise and honors of his profession. Nevertheless, as in consultations the good of the patient is the sole object in view, and this is often dependent on personal confidence, no intelligent regular practitioner, who has a license to practise from some medical board of known and acknowledged respectability, recognized by this Association, and who is in good moral and professional standing in the place in which he resides, should be fastidiously excluded from fellow-

ship, or his aid refused in consultation, when it is requested by the patient. But no one can be considered as a regular practitioner or a fit associate in consultation, whose practice is based on an exclusive dogma, to the rejection of the accumulated experience of the profession, and of the aids actually furnished by anatomy, physiology, pathology, and organic chemistry.

§ 2. In consultations, no rivalship or jealousy should be indulged; candor, probity, and all due respect should be exercised towards the physician having charge of the case.

§ 3. In consultations, the attending physician should be the first to propose the necessary questions to the sick; after which the consulting physician should have the opportunity to make such further inquiries of the patient as may be necessary to satisfy him of the true character of the case. Both physicians should then retire to a private place for deliberation; and the one first in attendance should communicate the directions agreed upon to the patient or his friends, as well as any opinions which it may be thought proper to express. But no statement or discussion of it should take place before the patient or his friends, except in the presence of all the faculty attending, and by their common consent; and no *opinions* or *prognostications* should be delivered which are not the result of previous deliberation and concurrence.

§ 4. In consultations, the physician in attendance should deliver his opinion first; and when there are several consulting, they should deliver their opinions in the order in which they have been called in. No decision, however, should restrain the attending physician from making such variations in the mode of treatment as any subsequent unexpected change in the character of the case may demand. But such variation, and the reasons for it, ought to be carefully detailed at the next meeting in consultation. The same privilege belongs also to the consulting physician if he is sent for in an emergency, when the regular attendant is out of the way, and similar explanations must be made by him at the next consultation.

§ 5. The utmost punctuality should be observed in the visits of physicians when they are to hold consultation together, and this is generally practicable, for society has been considerate enough to allow the plea of a professional engagement to take precedence of all others, and to be an ample reason for the relinquishment of any present occupation. But as professional engagements may sometimes interfere, and delay one of the parties, the physician who first arrives should wait for his associate a reasonable period, after

which the consultation should be considered as postponed to a new appointment. If it be the attending physician who is present, he will of course see the patient and prescribe; but if it be the consulting one, he should retire, except in case of emergency, or when he has been called from a considerable distance, in which latter case he may examine the patient, and give his opinion in *writing*, and *under seal*, to be delivered to his associate.

§ 6. In consultations, theoretical discussions should be avoided, as occasioning perplexity and loss of time. For there may be much diversity of opinion concerning speculative points, with perfect agreement in those modes of practice which are founded, not on hypothesis, but on experience and observation.

§ 7. All discussions in consultation should be held as secret and confidential. Neither by words nor manner should any of the parties to a consultation assert or insinuate that any part of the treatment pursued did not receive his assent. The responsibility must be equally divided between the medical attendants—they must equally share the credit of success as well as the blame of failure.

§ 8. Should an irreconcilable diversity of opinion occur when several physicians are called upon to consult together, the opinion of the majority should be considered as decisive; but if the numbers be equal on each side, then the decision should rest with the attending physician. It may, moreover, sometimes happen that two physicians cannot agree in their views of the nature of a case, and the treatment to be pursued. This is a circumstance much to be deplored, and should always be avoided, if possible, by mutual concessions, as far as they can be justified by a conscientious regard for the dictates of judgment. But in the event of its occurrence, a third physician should, if practicable, be called to act as an umpire; and, if circumstances prevent the adoption of this course, it must be left to the patient to select the physician in whom he is most willing to confide. But, as every physician relies upon the rectitude of his judgment, he should, when left in the minority, politely and consistently retire from any further deliberation in the consultation, or participation in the management of the case.

§ 9. As circumstances sometimes occur to render a *special consultation* desirable, when the continued attendance of two physicians might be objectionable to the patient, the member of the faculty whose assistance is required in such cases should sedulously guard against all future unsolicited attendance. As such consultations

require an extraordinary portion both of time and attention, at least a double honorarium may be reasonably expected.

§ 10. A physician who is called upon to consult, should observe the most honorable and scrupulous regard for the character and standing of the practitioner in attendance; the practice of the latter, if necessary, should be justified as far as it can be, consistently with a conscientious regard for truth, and no hint or insinuation should be thrown out which could impair the confidence reposed in him, or affect his reputation. The consulting physician should also carefully refrain from any of those extraordinary attentions or assiduities which are too often practised by the dishonest for the base purpose of gaining applause, or ingratiating themselves into the favor of families and individuals.

ART. V.—*Duties of physicians in cases of interference.*

§ 1. Medicine is a liberal profession, and those admitted into its ranks should found their expectations of practice upon the extent of their qualifications, not on intrigue or artifice.

§ 2. A physician, in his intercourse with a patient under the care of another practitioner, should observe the strictest caution and reserve. No meddling inquiries should be made—no disingenuous hints given relative to the nature and treatment of his disorder; nor any course of conduct pursued that may directly or indirectly tend to diminish the trust reposed in the physician employed.

§ 3. The same circumspection and reserve should be observed when, from motives of business or friendship, a physician is prompted to visit an individual who is under the direction of another practitioner. Indeed, such visits should be avoided, except under peculiar circumstances; and when they are made, no particular inquiries should be instituted relative to the nature of the disease, or the remedies employed, but the topics of conversation should be as foreign to the case as circumstances will admit.

§ 4. A physician ought not to take charge of or prescribe for a patient who has recently been under the care of another member of the faculty in the same illness, except in cases of sudden emergency or in consultation with the physician previously in attendance, or when the latter has relinquished the case, or been regularly notified that his services are no longer desired. Under such circumstances no unjust and illiberal insinuations should be thrown out in relation to the conduct or practice previously pursued, which should

be justified as far as candor and regard for truth and probity will permit; for it often happens that patients become dissatisfied when they do not experience immediate relief, and, as many diseases are naturally protracted, the want of success, in the first stage of treatment, affords no evidence of a lack of professional knowledge and skill.

§ 5. When a physician is called to an urgent case, because the family attendant is not at hand, he ought, unless his assistance in consultation be desired, to resign the care of the patient to the latter immediately on his arrival.

§ 6. It often happens in cases of sudden illness, or of recent accidents and injuries, owing to the alarm and anxiety of friends, that a number of physicians are simultaneously sent for. Under these circumstances, courtesy should assign the patient to the first who arrives, who should select from those present any additional assistance that he may deem necessary. In all such cases, however, the practitioner who officiates should request the family physician, if there be one, to be called, and, unless his further attendance be requested, should resign the case to the latter on his arrival.

§ 7. When a physician is called to the patient of another practitioner, in consequence of the sickness or absence of the latter, he ought, on the return or recovery of the regular attendant and with the consent of the patient, to surrender the case.

[The expression, "patient of another practitioner," is understood to mean a patient who may have been under the charge of another practitioner at the time of the attack of sickness, or departure from home of the latter, or who may have called for his attendance during his absence or sickness, or in any other manner given it to be understood that he regarded the said physician as his regular medical attendant.]

§ 8. A physician, when visiting a sick person in the country may be desired to see a neighboring patient who is under the regular direction of another physician, in consequence of some sudden change or aggravation of symptoms. The conduct to be pursued on such an occasion is to give advice adapted to present circumstances; to interfere no further than is absolutely necessary with the general plan of treatment; to assume no future directions unless it be expressly desired; and, in this last case, to request an immediate consultation with the practitioner previously employed.

§ 9. A wealthy physician should not give advice *gratis* to the affluent; because his doing so is an injury to his professional bre-

thren. The office of a physician can never be supported as an exclusively beneficent one; and it is defrauding, in some degree, the common funds for its support, when fees are dispensed with which might justly be claimed.

§ 10. When a physician who has been engaged to attend a case of midwifery is absent, and another is sent for, if delivery is accomplished during the attendance of the latter, he is entitled to the fee, but should resign the patient to the practitioner first engaged.

ART. VI.—*Of differences between physicians.*

§ 1. Diversity of opinion and opposition of interest may, in the medical as in other professions, sometimes occasion controversy and even contention. Whenever such cases unfortunately occur, and cannot be immediately terminated, they should be referred to the arbitration of a sufficient number of physicians or a *court-medical.*

§ 2. As peculiar reserve must be maintained by physicians towards the public, in regard to professional matters, and as there exist numerous points in medical ethics and etiquette through which the feelings of medical men may be painfully assailed in their intercourse with each other, and which cannot be understood or appreciated by general society, neither the subject-matter of such differences nor the adjudication of the arbitrators should be made public, as publicity in a case of this nature may be personally injurious to the individuals concerned, and can hardly fail to bring discredit on the faculty.

ART. VII.—*Of pecuniary acknowledgments.*

Some general rules should be adopted by the faculty, in every town or district, relative to *pecuniary acknowledgments* from their patients; and it should be deemed a point of honor to adhere to these rules with as much uniformity as varying circumstances will admit.

OF THE DUTIES OF THE PROFESSION TO THE PUBLIC, AND OF THE OBLIGATIONS OF THE PUBLIC TO THE PROFESSION.

ART. I.—*Duties of the profession to the public.*

§ 1. As good citizens, it is the duty of physicians to be ever vigilant for the welfare of the community, and to bear their part in sustaining its institutions and burdens; they should also be ever

ready to give counsel to the public in relation to matters especially appertaining to their profession, as on subjects of medical police public hygiene, and legal medicine. It is their province to enlighten the public in regard to quarantine regulations—the location, arrangement, and dietaries of hospitals, asylums, schools, prisons, and similar institutions—in relation to the medical police of towns, as drainage, ventilation, etc.—and in regard to measures for the prevention of epidemic and contagious diseases; and when pestilence prevails, it is their duty to face the danger, and to continue their labors for the alleviation of the suffering, even at the jeopardy of their own lives.

§ 2. Medical men should also be always ready, when called on by the legally constituted authorities, to enlighten coroners' inquests and courts of justice, on subjects strictly medical—such as involve questions relating to sanity, legitimacy, murder by poisons or other violent means, and in regard to the various other subjects embraced in the science of Medical Jurisprudence. But in these cases, and especially where they are required to make a *post-mortem* examination, it is just, in consequence of the time, labor, and skill required, and the responsibility and risk they incur, that the public should award them a proper honorarium.

§ 3. There is no profession by the members of which eleemosynary services are more liberally dispensed than the medical, but justice requires that some limits should be placed to the performance of such good offices. Poverty, professional brotherhood, and certain of the public duties referred to in the first section of this article, should always be recognized as presenting valid claims for gratuitous services; but neither institutions endowed by the public or by rich individuals, societies for mutual benefit, for the insurance of lives or for analogous purposes, nor any profession or occupation, can be admitted to possess such privilege. Nor can it be justly expected of physicians to furnish certificates of inability to serve on juries, to perform militia duty, or to testify to the state of health of persons wishing to insure their lives, obtain pensions, or the like, without a pecuniary acknowledgment. But to individuals in indigent circumstances, such professional services should always be cheerfully and freely accorded.

§ 4. It is the duty of physicians, who are frequent witnesses of the enormities committed by quackery, and the injury to health and even destruction of life caused by the use of quack medicines, to enlighten the public on these subjects, to expose the injuries

sustained by the unwary from the devices and pretensions of artful empirics and impostors. Physicians ought to use all the influence which they may possess, as professors in Colleges of Pharmacy, and by exercising their option in regard to the shops to which their prescriptions shall be sent, to discourage druggists and apothecaries from vending quack or secret medicines, or from being in any way engaged in their manufacture and sale.

ART. II.—*Obligations of the public to physicians.*

§ 1. The benefits accruing to the public, directly and indirectly, from the active and unwearied beneficence of the profession, are so numerous and important, that physicians are justly entitled to the utmost consideration and respect from the community. The public ought likewise to entertain a just appreciation of medical qualifications; to make a proper discrimination between true science and the assumption of ignorance and empiricism—to afford every encouragement and facility for the acquisition of medical education —and no longer to allow the statute-books to exhibit the anomaly of exacting knowledge from physicians, under a liability to heavy penalties, and of making them obnoxious to punishment for resorting to the only means of obtaining it.

OFFICERS

AND

PERMANENT MEMBERS.

CATALOGUE

OF THE

OFFICERS AND PERMANENT MEMBERS

OF THE

AMERICAN MEDICAL ASSOCIATION.

PRESIDENTS AND VICE-PRESIDENTS OF THE AMERICAN MEDICAL ASSOCIATION.

1847-48.

PHILADELPHIA.

PRESIDENT.

NATHANIEL CHAPMAN, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

JONATHAN KNIGHT, M.D., *Connecticut.*
ALEXANDER H. STEVENS, M.D., *New York.*
JAMES MOULTRIE, M.D., *South Carolina.*
A. H. BUCHANAN, M.D., *Tennessee.*

1848-49.

BALTIMORE.

PRESIDENT.

ALEXANDER H. STEVENS, M.D., *New York.*

VICE-PRESIDENTS.

JOHN C. WARREN, M.D., *Massachusetts.*
SAMUEL JACKSON, M.D., *Pennsylvania.*
PAUL F. EVE, M.D., *Georgia.*
W. M. AWL, M.D., *Ohio.*

1849-50.

BOSTON.

PRESIDENT.

JOHN C. WARREN, M.D., *Massachusetts.*

VICE-PRESIDENTS.

JOHN P. HARRISON, M.D., *Ohio.*
AUSTIN FLINT, M.D., *New York.*
HUGH H. MAGUIRE, M.D., *Virginia.*
R. S. STEWART, M.D., *Maryland.*

1850-51.

CINCINNATI.

PRESIDENT.

REUBEN D. MUSSEY, M.D., *Ohio.*

VICE-PRESIDENTS.

J. B. JOHNSON, M.D., *Missouri.*
DANIEL BRAINARD, M.D., *Illinois.*
A. LOPEZ, M.D., *Alabama.*
GEORGE W. NORRIS, M.D., *Pennsylvania.*

1851-52.

CHARLESTON.

PRESIDENT.

JAMES MOULTRIE, M.D., *South Carolina.*

VICE-PRESIDENTS.

GEORGE HAYWARD, M.D., *Massachusetts.*
B. R. WELLFORD, M.D., *Virginia.*
R. D. ARNOLD, M.D., *Georgia.*
J. B. FLINT, M.D., *Kentucky.*

1852-53.

RICHMOND.

PRESIDENT.

BEVERLY R. WELLFORD, M.D., *Virginia.*

VICE-PRESIDENTS.

JONATHAN KNIGHT, M.D., *Connecticut.*
THOMAS Y. SIMONS, M.D., *South Carolina.*
JAMES W. THOMSON, M.D., *Delaware.*
C. A. POPE, M.D., *Missouri.*

1853-54.

NEW YORK.

PRESIDENT.

JONATHAN KNIGHT, M. D., *Connecticut.*

VICE-PRESIDENTS.

USHER PARSONS, M. D., *Rhode Island.*
LEWIS CONDICT, M. D., *New Jersey.*
HENRY R. FROST, M. D., *South Carolina.*
R. L. HOWARD, M. D., *Ohio.*

1854-55.

ST. LOUIS.

PRESIDENT.

CHARLES A. POPE, M. D., *Missouri.*

VICE-PRESIDENTS.

E. D. FENNER, M. D., *Louisiana.*
N. S. DAVIS, M. D., *Illinois.*
WM. WRAGG, M. D., *South Carolina.*
JOHN GREEN, M. D., *Massachusetts.*

1855-56.

PHILADELPHIA.

PRESIDENT.

GEORGE B. WOOD, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

WM. M. BOLING, M. D., *Alabama.*
DANIEL TILDEN, M. D., *Ohio.*
D. HUMPHREYS STORER, M. D., *Massachusetts.*
GRAFTON TYLER, M. D., *District of Columbia.*

1856-57.

DETROIT.

PRESIDENT.

ZINA PITCHER, M. D., *Michigan.*

VICE-PRESIDENTS.

THOMAS W. BLATCHFORD, M. D., *New York.*
E. GEDDINGS, M. D., *South Carolina.*
WM. K. BOWLING, M. D., *Tennessee.*
W. H. BRISBANE, M. D., *Wisconsin.*

1857-58.

NASHVILLE.

PRESIDENT.

PAUL F. EVE, M. D., *Tennessee.*

VICE-PRESIDENTS.

R. J. BRECKENRIDGE, M. D., *Kentucky.*
W. H. BYFORD, M. D., *Indiana.*
D. M. REESE, M. D., *New York.*
HENRY F. CAMPBELL, M. D., *Georgia.*

1858-59.

WASHINGTON.

PRESIDENT.

HARVEY LINDSLEY, M. D., *District of Columbia.*

VICE-PRESIDENTS.

W. L. SUTTON, M. D., *Kentucky.*
JOSIAH CROSBY, M. D., *New Hampshire.*
THOMAS O. EDWARDS, M. D., *Iowa.*
W. C. WARREN, M. D., *North Carolina.*

1859-60.

LOUISVILLE.

PRESIDENT.

HENRY MILLER, M. D., *Kentucky.*

VICE-PRESIDENTS.

HENRY F. ASKEW, M. D., *Delaware.*
LYNDON A. SMITH, M. D., *New Jersey.*
CHARLES S. TRIPLER, M. D., *United States Army.*
CALVIN WEST, M. D., *Indiana.*

1860-63.

NEW HAVEN.

PRESIDENT.

ELI IVES, M. D., *Connecticut.*

VICE-PRESIDENTS.

WILSON JEWELL, M. D., *Pennsylvania.*
JOSEPH A. LOGAN, M. D., *Georgia.*
A. B. PALMER, M. D., *Michigan.*
JOSEPH N. MCDOWELL, M. D., *Missouri.*

1863-64.

CHICAGO.

PRESIDENT.

ALDEN MARCH, M. D., *New York.*

VICE-PRESIDENTS.

JAMES COUPER, M. D., *Delaware.*
DAVID PRINCE, M. D., *Illinois.*
CHRISTOPHER C. COX, M. D., *Maryland.*
EZRA S. CARR, M. D., *Wisconsin.*

1864.

NEW YORK.

PRESIDENT.

NATHAN S. DAVIS, M. D., *Illinois.*

VICE-PRESIDENTS.

W. H. MUSSEY, M. D., *Ohio.*
WORTHINGTON HOOKER, M. D., *Connecticut.*
WILLIAM WHELAN, M. D., *District of Columbia.*
F. E. B. HEINTZE, M. D., *Maryland.*

1865.

BOSTON.

The Constitution having been amended, the same officers presided also at Boston. (Vide *Transactions*, vol. xv. p. 50.)

1866.

BALTIMORE.

PRESIDENT.

D. HUMPHREYS STORER, M. D., *Massachusetts.*

VICE-PRESIDENTS.

JAMES F. HIBBERD, M. D., *Indiana.*
STEPHEN O. ALMY, M. D., *Ohio.*
THEOPHILUS C. DUNN, M. D., *Rhode Island.*
W. P. JOHNSON, M. D., *District of Columbia.*

1867.

CINCINNATI.

PRESIDENT.

HENRY F. ASKEW, M. D., *Delaware.*

VICE-PRESIDENTS.

WILLIAM K. BOWLING, M. D., *Tennessee.*
J. C. HUGHES, M. D., *Iowa.*
H. I. BOWDITCH, M. D., *Massachusetts.*
THOMAS C. BRINSMADE, M. D., *New York.*

1868.

WASHINGTON.

PRESIDENT.

SAMUEL D. GROSS, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

ALFRED C. POST, M. D., *New York.*
JOHN L. ATLEE, M. D., *Pennsylvania.*
DAVID W. YANDELL, M. D., *Kentucky.*
HORATIO ROBINSON STORER, M. D., *Massachusetts.*

1869.

NEW ORLEANS.

PRESIDENT.

WILLIAM O. BALDWIN, M. D., *Alabama.*

VICE-PRESIDENTS.

GEORGE MENDENHALL, M. D., *Ohio.*
NOBLE YOUNG, M. D., *District of Columbia.*
N. P. MONROE, M. D., *Maine.*
S. M. BEMISS, M. D., *Louisiana.*

1870.

WASHINGTON.

PRESIDENT.

GEORGE MENDENHALL, M. D., *Ohio.*

VICE-PRESIDENTS.

WARREN STONE, M. D., *Louisiana.*
LOUIS A. SAYRE, M. D., *New York.*
F. GURNEY SMITH, M. D., *Pennsylvania.*
JOHN S. MOORE, M. D., *Missouri.*

1871.

SAN FRANCISCO.

PRESIDENT.

ALFRED STILLÉ, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

J. S. WETHERLY, M. D., *Alabama.*
HENRY GIBBONS, M. D., *California.*
T. J. HEARD, M. D., *Texas.*
SAMUEL WILLEY, M. D., *Minnesota.*

PHILADELPHIA.

1872.

PRESIDENT.

D. W. YANDELL, M.D., *Kentucky.*

VICE-PRESIDENTS.

THOMAS M. LOGAN, M.D., *California.*
CHARLES L. IVES, M.D., *Connecticut.*
R. F. MICHEL, M.D., *Alabama.*
J. K. BARTLETT, M.D., *Wisconsin.*

OFFICERS FOR 1873.

ST. LOUIS.

PRESIDENT.

THOMAS M. LOGAN, M.D., *California.*

VICE-PRESIDENTS.

B. H. CATLIN, M.D., *Connecticut.*
W. M. MCPHEETERS, M.D., *Missouri.*
A. M. POLLOCK, M.D., *Pennsylvania.*
W. T. BRIGGS, M.D., *Tennessee.*

PERMANENT SECRETARY.

WILLIAM B. ATKINSON, M.D., *Pennsylvania.*

ASSISTANT SECRETARY.

M. A. PALLEN, M.D., *Missouri.*

TREASURER.

CASPAR WISTER, M.D., *Pennsylvania.*

LIBRARIAN.

WILLIAM LEE, M.D., *District of Columbia.*

PERMANENT MEMBERS.

"The sum of $5 shall be assessed annually upon each delegate to the sessions of the Association, as well as upon each of its Permanent Members, whether attending or not, for the purpose of raising a fund to defray the necessary expenses of the Association, and for printing the Transactions. The payment of this sum shall be required of the delegates and members in attendance upon the sessions of the Association previously to their taking seats and participating in the business of the session. Permanent Members not attending shall forward their yearly dues to the Treasurer, and thereby shall be entitled to receive a copy of the printed Transactions, the same as delegates.

"Any Permanent Member who shall fail to pay his annual dues for THREE SUCCESSIVE YEARS, unless absent from the country, shall be dropped from the roll of Permanent Members."

Explanation.—P. signifies President; V. P., Vice-President; T., Treasurer; S., Secretary; L., Librarian; an obelisk [†] prefixed to a name denotes deceased. The figures at the end of each line denote the date of membership.

†Abbe, Alanson	Boston, Mass.	1860
†Abbott, James B. [d. 1869.]	Sanbornton, N. H.	1848
Adams, Chas. Powell	Hastings, Minn.	1871
†Adams, Hiram [d. 1865]	Fabius, N. Y.	1860
Adams, H. O.	So. Royalston, Mass.	1872
†Adams, Horace W.	Boston, Mass.	1856
†Adams, Horatio [d. 1861]	Waltham, Mass.	1849
Adams, J. F. A.	Pittsfield, Mass.	1872
†Adams, Z. Boylston	Boston, Mass.	1847
Adrain, James A.	Logansport, Ind.	1871
Agard, Aurelius H.	Sandusky, Ohio.	1863
Agnew, Cornelius R.	New York, N. Y.	1860
Agnew, D. Hayes	Philadelphia, Pa.	1872
Alden, Chas. H.	Fort Gratiot, Mich.	1872
Alden, Ebenezer	Randolph, Mass.	1849
†Alexander, Ashton	Baltimore, Md.	1848
Allen, Charles	Washington, D. C.	1866

Allen, Charles L.	Rutland, Vt.	1853
Allen, Ezra P.	Athens, Pa.	1860
Allen, Harrison	Philadelphia, Pa.	1872
†Allen, Hiram [d. 1864]	Woonsocket, R. I.	1852
Allen, Joshua G.	Philadelphia, Pa.	1872
Allen, J. M.	Liberty, Mo.	1859
Allen, Nathan	Lowell, Mass.	1849
†Allen, W. H. [d. 1864]	Orono, Me.	1856
†Alley, John B. [d. 1862]	Boston, Mass.	1852
†Amerman, George K.	Chicago, Ill.	1863
Ames, Albert Alonzo	Minneapolis, Minn.	1871
Ames, Alfred Elisha	Minneapolis, Minn.	1871
Amory, Robert	Brookline, Mass.	1870
Amory, S. A.	Quincy, Ill.	1870
Anawalt, J. W.	Greensburg, Pa.	1872
Anderson, R. F.	Gardner, Mass.	1872
Anderson, Wm.	Indiana, Pa.	1868
Anderson, W. C.	Stapleton, N. Y.	1855
Andrews, E.	Chicago, Ill.	1851
Andrews, George Pierce	Detroit, Mich.	1869
†Andrews, Robert [d. 1869]	Orange, Mass.	1866
Andros, F.	McGregor, Iowa.	1872
Anfoux, Octavius	New Orleans, La.	1869
Antisell, Thomas	Georgetown, D. C.	1858
†Appleton, John [d. 1869]	Cambridgeport, Mass.	1867
Appley, W. L.	Coshecton, N. Y.	1872
Armor, Samuel G.	Brooklyn, N. Y.	1850
Armsby, James H.	Albany, N. Y.	1853
Armstrong, E. W.	Rochester, N. Y.	1855
Arnold, Abraham B.	Baltimore, Md.	1868
Arnold, E. S. F.	Yonkers, N. Y.	1863
Arnold, Richard Dennis, V. P.	Savannah, Ga.	1847
Arnold, S. R.	Monroe, Mich.	1856
Asdale, Wm. James	Pittsburg, Pa.	1869
Ash, H. St. Clair	Philadelphia, Pa.	1864
Ashford, Francis A. L.	Washington, D. C.	1868
Ashhurst, John	Philadelphia, Pa.	1872
Ashhurst, Samuel	Philadelphia, Pa.	1872
Ashmead, William	Philadelphia, Pa.	1847
Askew, Henry F. V. P.; P.	Wilmington, Del.	1847
Atchinson, W. A.	Bowling Green, Ky.	1857

Atkinson, J. F.	Lexington, Mo.	1854
Atkinson, William B. s.	Philadelphia, Pa.	1859
Atlee, John L.	Lancaster, Pa.	1847
Atlee, Washington L.	Philadelphia, Pa.	1847
Aulick, R. V.	Washington, D. C.	1872
Avery, A. G.	Jersey City, N. J.	1872
Ayer, Washington	San Francisco, Cal.	1871
†Ayres, Daniel [d. 1853]	Brooklyn, N. Y.	1847
Ayres, W. O.	San Francisco, Cal.	1871
Babcock, Heman P.	Oakland, Cal.	1871
†Bache, Franklin [d. 1864]	Philadelphia, Pa.	1847
Bache, Thomas Hewson	Philadelphia, Pa.	1855
Backus, Chas. W.	Three Rivers, Mich.	1872
Bacon, Charles Giles	Fulton, N. Y.	1855
†Baer, M. S.	Baltimore, Md.	1848
†Bailey, R. S.	Charleston, S. C.	1852
Baily, Jonathan R.	Ferguson's Station, Ky.	1858
Bailey, Wm. H.	Albany, N. Y.	1870
Baird, George	Wheeling, W. Va.	1870
†Baker, Abraham H.	Cincinnati, Ohio.	1850
†Baker, Alfred	Baltimore, Md.	1848
†Baker, Charles L. [d. 1859]	Lancaster, Pa.	1847
†Baker, George R. [d. 1866]	Wilmington, Del.	1847
Baker, John W. H.	Davenport, Iowa.	1860
Baldwin, Wm. Owen, P.	Montgomery, Ala.	1868
Baltzell, William H.	Baltimore, Md.	1855
Banks, James L.	New York, N. Y.	1864
Barber, E. F.	Eureka, Cal.	1871
†Bare, A. S.	Lancaster, Pa.	1850
Barker, B. Fordyce	New York, N. Y.	1848
Barker, H. H.	Washington, D. C.	1872
Barnett, C. V.	Coxsackie, N. Y.	1863
Barnett, James Richards	Vicksburg, Miss.	1869
Barnum, Bolivar	Schoolcraft, Mich.	1856
Barr, George W.	Titusville, Pa.	1868
Barr, Wm. F.	Abingdon, Va.	1870
Barrett, S.	LeRoy, N. Y.	1856
†Barrington, Samuel	U. S. Navy.	1855
Barrows, Ashbell W.	Hartford, Conn.	1853
Barrows, Egbert S.	Davenport, Iowa.	1860
Barry, R. A.	New York, N. Y.	1865

†Barstow, Wm. A. [d. 1871]	San Francisco, Cal.	1871
Bartholow, Roberts	Cincinnati, Ohio.	1867
†Bartlett, George [d. 1864]	Boston, Mass.	1849
Bartlett, John Knowlton, v. p.	Milwaukee, Wis.	1854
†Bartlett, Josiah [d. 1853]	Stratham, N. H.	1847
†Bartlett, Lyman [d. 1865]	New Bedford, Mass.	1849
Barton, Edw.	South Orange, Mass.	1858
†Barton, Edward H. [d. 1859]	New Orleans, La.	1848
Barton, J. Morrie	Philadelphia, Pa.	1872
†Baskin, George W.	Mercer, Pa.	1850
Bassett, Moses F.	Quincy, Ill.	1864
†Batchelder, John P. [d. 1868]	New York, N. Y.	1849
†Batcheller, Stephen [d. 1848]	Royalston, Mass.	1848
Bates, C. M.	San Francisco, Cal.	1871
Bates, S. S.	Titusville, Pa.	1868
Bates, Wm. Jourdan	Wheeling, W. Va.	1848
Bates, Jr., W. J.	Wheeling, W. Va.	1872
Battles, W. S.	Shreve, Ohio.	1872
†Baumgarten, F. E. [d. 1869]	St. Louis, Mo.	1854
†Baxter, Hiram [d. 1865]	Stillwater, N. Y.	1849
Baxter, J. H.	Washington, D. C.	1865
Baxter, W. H.	Wilton, Iowa.	1870
†Bay, William [d. 1865]	Albany, N. Y.	1853
Bayless, G. W.	Louisville, Ky.	1859
†Beach, Samuel	Bridgeport, Conn.	1849
Beales, Joseph	U. S. Navy.	1865
Beard, F. W.	Harrodsburg, Ind.	1872
Beard, Geo. M.	Brooklyn, N. Y.	1872
†Beardsley, Levi	Oneida, N. Y.	1858
Beardsley, Sheldon	North Brandford, Conn.	1849
Beasley, Geo. F.	Lafayette, Ind.	1867
†Beck, T. Romeyn [d. 1855]	Albany, N. Y.	1852
Beech J. H.	Coldwater, Mich.	1854
Beeler, George	Clinton, Ky.	1868
Bell, A. Nelson	Brooklyn, N. Y.	1860
†Bell, John [d. 1872]	Philadelphia, Pa.	1847
†Bell, Luther V. [d. 1862]	Charleston, Mass.	1849
†Bellinger, John	Charleston, S. C.	1851
Bellows, Horatio Knight	Norwich, N. Y.	1871
Belt, Alfred M.	Salem, Oregon.	1871
†Bemis, David	Chickopee, Mass.	1849

Bemiss, S. Merrifield, S.; V. P.	New Orleans, La.	1857
Benham, Silas N.	Pittsburg, Pa.	1868
Bennett, Geo. C.	Erie, Pa.	1867
Bentley, Edwin	U. S. Army.	1871
Berkebile, J. K.	Fairmont, W. Va.	1870
Berney, James	Montgomery, Ala.	1869
†Berry, William H. [d. 1859]	Washington, D. C.	1858
†Bertolet, P. G.	Oley, Pa.	1855
Bethune, George A.	Boston, Mass.	1849
Bibb, Geo. Richard	Denver, Col.	1869
†Bibbins, William B. [d. 1871]	New York, N. Y.	1864
†Bibighaus, C. H. [d. 1854]	Philadelphia, Pa.	1850
†Bickford, Alphonso [d. 1869]	Dover, N. H.	1865
Bigelow, John M.	Detroit, Mich.	1850
Billings, John Shaw	Washington, D. C.	1868
Bishop, Timothy H.	New Haven, Conn.	1847
Bishop, S. P.	Delta, Ohio.	1872
Bissell, Daniel P.	Utica, N. Y.	1849
Black, John	Plattsmouth, Neb.	1871
†Blackburn, C. J. [d. 1868]	Covington, Ky.	1850
Blackburn, H.	Ft. Madison, Iowa.	1867
Blackford, Benjamin	Lynchburg, Va.	1870
†Blackman, Geo. C. [d. 1871]	Cincinnati, Ohio.	1867
†Blair, Arba [d. 1863]	Rome, N. Y.	1860
Blakeman, Rufus	Fairfield, Conn.	1860
Blakeman, William N.	New York, N. Y.	1847
Blanchard, D. W.	Coventry, Vt.	1865
Bland, W. J.	Fairmont, W. Va.	1872
Blane, John	Perryville, N. J.	1855
†Blatchford, Thomas W. V. P. [d. 1865]	Troy, N. Y.	1847
Blelick, N. G.	Mt. Zion, Ill.	1872
Bly, Douglas	Rochester, N. Y.	1859
†Bobbs, J. S. [d. 1870]	Indianapolis, Ind.	1867
Bodine, J. M.	Louisville, Ky.	1867
Bogan, M. V. B.	Washington, D. C.	1868
Bogue, R. G.	Chicago, Ill.	1867
†Bohrer, Benjamin S. [d. 1862]	Georgetown, D. C.	1858
Boker, Charles S.	Philadelphia, Pa.	1864
†Boling, Wm. M. V. P.	Montgomery, Ala.	1855
Bolles, Lucius S.	Philadelphia, Pa.	1872

†Bolton, Jackson [d. 1866]	New York, N. Y.	1853
†Bond, Henry [d. 1859]	Philadelphia, Pa.	1847
Bond, Samuel S.	Washington, D. C.	1866
Bondurant, Walter Ernest	Natchez, Miss.	1869
Bontecou, Reed B.	Troy, N. Y.	1853
Book, J. B.	Detroit, Mich.	1870
Booth, David Winfield	Vicksburg, Miss.	1869
Borland, J. Nelson	Boston, Mass.	1853
Boucher, James H.	Iowa City, Iowa.	1860
Bowditch, Henry I., S; V. P.	Boston, Mass.	1848
†Bowen, Samuel	Thompson, Conn.	1849
Bowling, Wm. Kendall, V. P.	Nashville, Tenn.	1854
Bowman, Edward Hale	Andalusia, Ill.	1860
Boyd, John M.	Knoxville, Tenn.	1857
†Boyden, Frederick [d. 1872]	Hinsdale, N. H.	1855
Boyer, Pierre Caverly	New Orleans, La.	1869
Boyle, Cornelius	Washington, D. C.	1872
Bozeman, Nathan	New York, N. Y.	1858
Bradbury, Wm. Thomas	San Francisco, Cal.	1871
Bradford, George W.	Homer, N. Y.	1847
Brady, John A.	Brooklyn, N. Y.	1856
†Brainard, Daniel, V. P. [d. '66]	Chicago, Ill.	1850
Brakely, P. F.	Belvidere, N. J.	1853
Brandt, E. B.	Mechanicsburg, Pa.	1872
†Breckinridge, R. J. V. P. [d. '67]	Louisville, Ky.	1850
Breden, S.	Butler, Pa.	1872
Breed, S. P.	Princeton, Ill.	1870
Breinig, P. B.	Hellertown, Pa.	1865
Brehman, G. Edmund	Altoona, Pa.	1870
Bridge, Norman	Chicago, Ill.	1870
Briggs, Wm. Thompson, V. P.	Nashville, Tenn.	1869
†Brinsmade, T. C. V. P. [d. 1868]	Troy, N. Y.	1848
Brinton, John B.	Marshalton, Pa.	1853
Brisbane, W. Henry, V. P.	Beaufort, S. C.	1856
†Briscoe, John Hanson	Baltimore, Md.	1847
Brock, Hugh W.	Morgantown, W. Va.	1870
Brodie, Wm. S.	Detroit, Mich.	1854
Bronson, John R.	Attleboro', Mass.	1860
Brooks, P. B.	Binghampton, N. Y.	1853
Brown, Alex. Porter	Clinton, La.	1869
Brown, Benj. Stanton	Bellefontaine, Ohio.	1857

Brown, Hawkins	Hustonville, Ky.	1870
Brown, Jos. Clark	Urbana, Ohio.	1864
Brown, Richard E.	Mt. Holly, N. J.	1870
†Brown, Thomas	Manchester, N. H.	1849
Brown, W. Owen	Providence, R. I.	1855
Brown, W. T.	Cincinnati, Ohio.	1867
Browne, John Mills	U. S. Navy.	1871
†Browne, O. A. [d. 1855]	Hicksford, Va.	1852
†Brownell, Clarence M. [d. '62]	East Hartford, Conn.	1853
†Brownell, Richmond	Providence, R. I.	1853
†Brownell, Russ B. [d. 1867]	New York, N. Y.	1864
Bruce, James M.	Lexington, Ky.	1867
Bruehl, Gustavus	Cincinnati, Ohio.	1871
Brumbaugh, A. B.	Huntingdon, Pa.	1872
Bruner, Daniel J.	Columbia, Pa.	1871
Buchanan, T. B.	Nashville, Tenn.	1872
†Buchtel, J. B. [d. 1870]	Des Moines, Iowa.	1863
Buck, A. H.	New York, N. Y.	1872
†Buck, Ephraim [d. 1859]	Boston, Mass.	1849
Buck, Gurdon	New York, N. Y.	1848
Buckingham, Richard Green	Denver, Col.	1871
Bucklin, Daniel D.	Lansingburgh, N. Y.	1870
Buckner, James H.	Cincinnati, Ohio.	1864
Budd, A. E.	Mt Holly, N. J.	1853
Buell, Richard M.	Brooklyn, N. Y.	1864
Buffington, Thos. Jefferson	Baton Rouge, La.	1869
Bulkely, J. E.	Wilkesbarre, Pa.	1872
†Bulkley, Henry D. [d. 1872]	New York, N. Y.	1847
Bulkley, John W.	Washington, D. C.	1866
†Bullard, Talbut [d. 1863]	Indianapolis, Ind.	1851
Bullock, Otis	Warren, R. I.	1864
Bullock, Wm. Townsend	Providence, R. I.	1868
Burdick, Francis	Johnston, N. Y.	1865
Burge, J. H. Hobart	Brooklyn, N. Y.	1857
Burnap, Sewall G.	Holliston, Mass.	1853
Burns, Robert	Philadelphia, Pa.	1865
Burpee, David	Philadelphia, Pa.	1872
†Burr, David Silliman [d. '65]	Westport, Conn.	1855
Burr, George	Binghampton, N. Y.	1865
Burrall, Fred. A.	New York, N. Y.	1872
†Burrowes, Francis S.	Lancaster, Pa.	1848

†Burton, C. V. W. [d. 1860]	Lansingburg, N. Y.	1849
Burton, Matthew Henry	Troy, N. Y.	1869
†Burwell, Bryant	Buffalo, N. Y.	1847
Burwell, George N.	Buffalo, N. Y.	1850
Busey, Samuel C.	Washington, D. C.	1870
Bush, James Miles	Lexington, Ky.	1850
Bush, Lewis P.	Wilmington, Del.	1847
Bushnell, J. H.	Washington, D. C.	1868
†Butler, A. B.	Richmond, Ind.	1859
Butler, S. W.	Philadelphia, Pa.	1853
Butt, W. B.	Washington, D. C.	1870
†Butterfield, John	Columbus, Ohio,	1847
Byford, William H. v. p.	Chicago, Ill.	1854
Byington, N. H.	Southampton, Conn.	1870
Byrne, John	Brooklyn, N. Y.	1864
†Cabaniss, Alfred Barwell [d. 1871]	Jackson, Miss.	1866
Cabell, J. L.	University of Va.	1855
Caldwell, Aug. B.	Santa Clara, Cal.	1871
Calkins, A. R.	Allegan, Mich.	1872
Calkins, Marshall	Springfield, Mass.	1866
Calvin, D. M.	Meadville, Pa.	1870
†Cammann, G. P.	New York, N. Y.	1853
Campbell, M.	Parkersburg, W. Va.	1859
†Canfield, J. W.	Morristown, N. J.	1849
Cantrell, D. W.	Baltimore, Md.	1872
Cantwell, A. W.	Davenport, Iowa.	1872
Capron, George	Providence, R. I.	1849
†Carey, Abel [d. 1872]	Salem, Ohio.	1855
Carleton, Charles M.	Norwich, Conn.	1865
Carmalt, W. H.	New York, N. Y.	1864
Caro, Sylvatora	New York, N. Y.	1872
Carpenter, E. W.	Brooklyn, N. Y.	1872
Carpenter, Henry	Lancaster, Pa.	1847
Carpenter, Horace	Salem, Oregon.	1860
†Carpenter, James S. [d. 1872]	Pottsville, Pa.	1849
Carpenter, John T.	Pottsville, Pa.	1867
†Carpenter, Wm. M.	New Orleans, La.	1847
†Carr, Edson [d. 1861]	Canandaigua, N. Y.	1848
†Carr, John	Sanbornton, N. H.	1849

Carrick, A. L.	Cincinnati, Ohio.	1867
Carrington, C.	Farmington, Ct.	1872
†Carrington, Edwin W.	Farmington, Conn.	1849
Carroll, O. A.	Orange, N. Y.	1867
Carson, William	Cincinnati, Ohio.	1850
Carter, Charles	Philadelphia, Pa.	1872
Carter, D. D.	Versailles, Ky.	1872
†Cash, Merritt H. [d. 1861]	Ridgebury, N. Y.	1852
†Cassidy, Patrick [d. 1865]	Lancaster, Pa.	1853
†Castle, Andrew	Woodbridge, Conn.	1853
Castlehun, F. C.	St. Louis, Mo.	1871
Catlin, Benjamin H., V. P.	West Meriden, Conn.	1853
Cattell, Samuel G.	Deerfield, N. J.	1866
Chaillé, Standford Emerson	New Orleans, La.	1869
Chamberlain, Wm.	New York, N. Y.	1870
Chamberlaine, J. E. M.	Easton, Md.	1855
Chamberlayne, John K.	Utica, N. Y.	1856
Chambers, Wm. Mortimer	Charleston, Ill.	1852
Chancellor, C. W.	Baltimore, Md.	1870
Chapin, J. B.	Ovid, N. Y.	1872
Chapman, J. Francis	Ketonah, N. Y.	1872
†Chapman, Nathaniel, P.[d.'53]	Philadelphia, Pa.	1847
†Chase, Charles	Deerfield, N. H.	1849
Cheeny, Wm. Mahan	Kenton, O.	1869
†Cheeny, L. P. [d. 1863]	Chicago, Ill.	1863
†Cheeseman, Jno. C. [d. 1862]	New York, N. Y.	1853
Cheeseman, T. M.	New York, N. Y.	1872
Chenery, Wm. Fitch	Chico, Cal.	1871
Chenoweth, W. J.	Decatur, Ill.	1872
Cheston, Daniel Murray, S.	Philadelphia, Pa.	1866
†Chew, Samuel [d. 1863]	Baltimore, Md.	1847
†Childs, Henry H. [d. 1868]	Pittsfield, Mass.	1849
†Childs, Timothy	Pittsfield, Mass.	1860
Childs, William	Bath, N. H.	1872
Christian, M. P.	Lynchburg, Va.	1868
Christie, L. H.	Petroleum Centre, Pa.	1872
Christy, R. W.	Hollidaysburg, Pa.	1872
†Church, William Henry	New York, N. Y.	1853
†Clanton, S. W.	Warsaw, Ala.	1854
Clapp, Asahel	New Albany, Ind.	1850
Clapp, Sylvanus	Pawtucket, R. I.	1849
Clark, Alonzo	New York, N. Y.	1847

Clark, C. C. P.	Oswego, N. Y.	1870
Clark, John McWhorter	Mount Hope, Ala.	1869
Clark, Jos. E.	Brooklyn, N. Y.	1870
†Clark, Moses	East Cambridge, Mass.	1853
Clark, Samuel S.	Belvidere, N. J.	1866
†Clarke, J. Henry [d. 1869]	Newark, N. J.	1851
Cleeman, Richard A.	Philadelphia, Pa.	1872
†Cleveland, Hiram	North Providence, R. I.	1853
†Clifford, Lewis W.	Providence, R. I.	1847
Cluness, Wm. Robert	Sacramento, Cal.	1871
Clymer, George	U. S. Navy.	1858
†Coad, Joseph R. [d. 1868]	Philadelphia, Pa.	1865
Coakley, J. B.	Richmond, Va.	1872
†Coale, William Edw. [d. 1863]	Boston, Mass.	1849
Cobb, J. V.	Rome, N. Y.	1856
Coblentz, Joseph	Reading, Pa.	1872
Cochran, Jerome	Mobile, Ala.	1869
†Cock, Thomas [d. 1869]	New York, N. Y.	1847
Cock, Thomas F.	New York, N. Y.	1848
Cockrill, James J.	Baltimore, Md.	1866
†Cockcroft, James	New York, N. Y.	1853
†Coe, A. B. [d. 1854]	Oswego, N. Y.	1853
Coffey, Henry T.	Pittsburg, Pa.	1866
Cohen, David	San Francisco, Cal.	1871
Cohen, Jacob Solis	Philadelphia, Pa.	1864
†Cole, N. W.	Burlington, N. J.	1847
Cole, Richard Beverley	Oakland, Cal.	1871
†Coleman, Isaac P. [d. 1869]	Pemberton, N. J.	1855
Collins, Clarkson T.	Great Barrington, Mass.	1849
Collins, George Lewis	Providence, R. I.	1849
Collins, James	Philadelphia, Pa.	1868
Colten, F. H.	Brooklyn, N. Y.	1872
Combs, W. H.	Washington, D. C.	1870
Comegys, Cornelius G.	Cincinnati, Ohio.	1853
Cominger, J. A.	Indianapolis, Ind.	1872
Compton, Henry Maclin	Nashville, Tenn.	1869
Compton, Wm. McCorkle	Holly Springs, Miss.	1869
†Conant, D. S. [d. 1865]	New York, N. Y.	1855
†Condict, Lewis, V. P.	Morristown, N. J.	1853
Condie, D. Francis, T.	Philadelphia, Pa.	1847
Congar, Horace M.	Buffalo, N. Y.	1850

Conner, P. S.	Cincinnati, Ohio.	1867
†Connolly, James J. [d. 1871]	New York, N. Y.	1864
†Conrey, Jno.	Manayunk, Pa.	1855
†Conway, James H.	Richmond, Va.	1860
†Cook, Chas.	Jersey City, N. J.	1853
Cook, E. P.	Mendota, Ill.	1868
†Coolidge, R. Hoffman [d. '66]	Washington, D. C.	1853
†Cooper, James S. [d. 1867]	New York, N. Y.	1853
Cooper, John M.	Wellsburg, W. Va.	1870
Cooper, Richard M.	Camden, N. J.	1847
Corbit, Wm. B.	Philadelphia, Pa.	1870
Corliss, Hiram	Greenwich, N. Y.	1847
Cornell, Wm. M.	Boston, Mass.	1865
†Cornish, Aaron	New Bedford, Mass.	1849
Corson, Hiram	Plymouth Meeting, Pa.	1847
Corson, Joseph	Portsmouth, Ohio.	1853
Corson, William	Norristown, Pa.	1854
†Cotes, John	Batavia, N. Y.	1858
Cotes, Levant B.	Batavia, N. Y.	1856
Cotting, B. E.	Roxbury, Mass.	1849
Cotton, David B.	Portsmouth, Ohio.	1859
Cotton, J. D.	Marietta, Ohio.	1853
†Couper, James, V. P. [d. 1865]	New Castle, Del.	1847
Coventry, Charles B.	Utica, N. Y.	1849
Cowan, George	Danville, Ky.	1867
Cowden, J. W.	Bellevue, Iowa.	1870
Cox, Christopher C. V. P.	Washington, D. C.	1848
Cox, G. W.	Clayton, Ill.	1872
Craft, M. Sidney	Jackson, Miss.	1869
Craig, Alexander	Columbia, Pa.	1870
Craig, B. F.	Washington, D. C.	1868
†Craig, John W. [d. 1863]	Plainfield, N. J.	1853
Crampton, O. L.	Mobile, Ala.	1872
†Crandell C. Milford [d. 1867]	Belfast, N. Y.	1853
Crane, Job S.	Elizabeth, N. J.	1871
Crawford, J. B.	Wilkesbarre, Pa.	1872
Crawford, J. S.	Williamsport, Pa.	1872
Crawford, Robert	Cooperstown, Pa.	1870
Crist, David L.	Bloomington, Ill.	1865
Croggon, Richard C.	Washington, D. C.	1864
Crosby, A. B.	Brooklyn, N. Y.	1872

Cross, E. C.	Rochester, Minn.	1872
Culbertson, H.	Zanesville, Ohio.	1872
Cullen, Thomas F.	Camden, N. J.	1855
Cummings, James	Wheeling, W. Va.	1870
Cummings, Robert Hazlett	Wheeling, W. Va.	1868
†Cunningham, Oliver [d. '60]	Beaver, Pa.	1858
Currey, James H.	Baltimore, Md.	1866
†Currey, R. O.	Knoxville, Tenn.	1857
Curtin, Roland G.	Philadelphia, Pa.	1872
Curtis, Edward M.	Sacramento, Cal.	1871
Curtis, Levi	Philadelphia, Pa.	1855
Curwen, John	Harrisburg, Pa.	1870
Cushing, Clinton	Oakland, Cal.	1871
Cushman, T. T.	Lunenburgh, Vt.	1865
Cutler, Samuel Prentiss	Holly Springs, Miss.	1869
†Cutter, Benjamin	Woburn, Mass.	1849
Cutter, Ephraim	Woburn, Mass.	1871
†Cutter, Nehemiah	Pepperell, Mass.	1847
Da Costa, J. M.	Philadelphia, Pa.	1855
†Dailey, E. D.	Smyrna, Del.	1858
†Dalton, Jno. C. [d. 1864]	Lowell, Mass.	1848
Daly, William H.	Pittsburg, Pa.	1868
Damon, Howard F.	Boston, Mass.	1864
†Dana, A. G.	Brandon, Vt.	1849
Dancy, Francis William	Holly Springs, Miss.	1869
Darby, John T.	Columbia, S. C.	1870
†Darlington, Wm. [d. 1863]	Westchester, Pa.	1851
†Davis, Charles A.	Chelsea, Mass.	1853
Davis, Nathaniel Reynolds	San Francisco, Cal.	1871
Davis, Nathan Smith V. P.; P.	Chicago, Ill.	1847
†Davis, Robert T.	Fall River, Mass.	1855
Davis, S. T.	Millersville, Pa.	1870
Dawson, Benj. Frederick	New York, N. Y.	1869
†Dawson, Jno. [d. 1867]	Columbus, Ohio.	1855
Deal, Lemuel J.	Philadelphia, Pa.	1868
Dean, Benj. D.	San Francisco, Cal.	1871
Dean, H. W.	Rochester, N. Y.	1855
Dean, Richard C.	Camden, N. J.	1864
Deane, A. C.	Greenfield, Mass.	1870
Deane, Chas. T.	San Francisco, Cal.	1871

De Bruler, James P.	Evansville, Ind.	1867
De Camp, Wm. H.	Grand Rapids, Mich.	1867
De La Cossett, H.	Greenville, Pa.	1872
Delano, B. L.	Lockport, N. Y.	1863
†Delany, M. G.	United States Navy.	1849
Denig, Robert M.	Columbus, Ohio.	1864
Dennis, T. H.	New Orleans, La.	1870
Dennis, Welding F.	Wilkesbarre, Pa.	1872
Dent, W. M.	Newburg, W. Va.	1870
†Dering, Nicoll H. [d. 1867]	Utica, N. Y.	1849
Detwiler, B. H.	Williamsport, Pa.	1866
†Dickson, James H. [d. 1863]	Wilmington, N. C.	1852
Dickson, John H.	Reicestertown, Md.	1870
†Dickson, Samuel H. [d. 1872]	Philadelphia, Pa.	1851
Didama, Henry P.	Syracuse, N. Y.	1864
Dillard, John	Lexington, Ky.	1869
†Dillard, Thomas [d. 1870]	Philadelphia, Pa.	1855
†Dilworth, Samuel	Pittsburg, Pa.	1850
Ditzler, Robert H.	Bowling Green, Ky.	1870
Divine, Kinsman Clinton	Canton, Miss.	1857
Dodge, A. W.	Baltimore, Md.	1872
Dodge, J. S. [d. 1872]	Cincinnati, Ohio.	1850
Dodson, N. M.	Berlin, Wis.	1872
†Donaghe, William R.	New York, N. Y.	1860
Donaldson, Francis	Baltimore, Md.	1848
†Donoughue, Eugene O. [d.'67]	Bergen, N. Y.	1853
Dorr, James Colby	Medford, Mass.	1868
†Dorsey, Lloyd	Frederick, Md.	1848
Dougherty, B. A.	Cumberland, Md.	1872
Douglas, George	Oxford, N. Y.	1869
Douglass, S. H.	Ann Arbor, Mich.	1856
Dove, George M.	Washington D. C.	1853
Dowell, Greensville	Galveston, Texas.	1866
†Dowler, Bennet	New Orleans, La.	1850
Downes, Charles S.	Nottingham, N. H.	1864
†Downes, John K.	New Haven, Conn.	1855
Downs, Henry S.	New York, N. Y.	1848
†Drake, Daniel	Cincinnati, Ohio.	1850
Draper, L. J.	Washington, D. C.	1868
†Drayton, Henry E. [d. 1862]	Philadelphia, Pa.	1851
Drew, E. S.	New Orleans, La.	1870

Drinkard, Wm. B.	Washington, D. C.	1868
Duer, Edward L.	Philadelphia, Pa.	1872
Duhring, L. A.	Philadelphia, Pa.	1872
†Duffield, Samuel	Lancaster, Pa.	1847
Duhamel, Wm. Jas. Chamberlin	Washington, D. C.	1853
Dunahue, Henry James	Sandusky, Ohio.	1856
†Dunbar, Jno. R. W. s. [d. 1871]	Baltimore, Md.	1847
Duncan, Chas. M.	Shelburne, Mass.	1866
Duncan, W. S.	Brownsville, Pa.	1870
†Dunglison, Robley [d. 1869]	Philadelphia, Pa.	1857
Dunlap, C. W.	Springfield, Ohio,	1872
Dunlap, Richard William	Danville, Ky.	1869
Durant, Ghislani	New York, N. Y.	1872
†Dwight, W. C.	Moscow, N. Y.	1853
†Dwight, William W.	New York, N. Y.	1860
Dyer, Ezra	Philadelphia, Pa.	1864
Eagleson, D. S.	West Alexander, Pa.	1872
Edgar, W. S.	St. Louis, Mo.	1854
Edward, D. M.	Woonsocket, R. I.	1872
Edwards, R. A.	Wallon, Ky.	1850
Egbert, T. W.	Oil City, Pa.	1872
Ehler, J. Augustus	Lancaster, Pa.	1848
Ehrenberg, Theo.	San Francisco, Cal.	1871
†Elbert, John D. [d. 1866]	Keosaqua, Iowa.	1854
Eliot, Johnson	Washington, D. C.	1853
Elmer, H. W.	Philadelphia, Pa.	1870
Elmer, R. W.	Bridgeton, N. J.	1872
Elmer, William	Bridgeton, N. J.	1850
Elsberg, Louis	New York, N. Y.	1864
Elsner, John	Denver, Col.	1871
†Elsten, W. P. [d. 1872]	Columbia, Ohio.	1867
†Ely, Edward [d. 1860]	New Hope, Pa.	1850
Ely, W. W.	Rochester, N. Y.	1856
Ellegood, R. G.	Concord, Del.	1872
Ellinwood, Chas. N.	San Francisco, Cal.	1871
†Elliot, George T. Jr. [d. 1871]	New York, N. Y.	1855
Elliott, Thomas A.	Orangeburg, S. C.	1851
†Ellis, J. James	Bristol, R. I.	1860
Emanuel, Manley	Philadelphia, Pa.	1855
Emmit, Thomas Addis	New York, N. Y.	1855

†Enos, De Witt C. [d. 1869]	Brooklyn, N. Y.	1856
Eshleman, Isaac Stouffer	Philadelphia, Pa.	1869
†Evans, Asbury	Covington, Ky.	1850
Evans, Horace Y.	Philadelphia, Pa.	1872
Evans, Isaac Newton	Hatboro, Pa.	1870
Evans, Warwick	Washington, D. C.	1870
Eve, Joseph A.	Augusta, Ga.	1848
Eve, Paul Fitzsimons, V. P.; P.	Nashville, Tenn.	1848
†Everett, S. W. [d. 1862]	Quincy, Ill.	1856
Eversfield, Charles	U. S. Navy.	1864
Evins, T. A.	Anderson, S. C.	1872
Evins, T. B.	Baltimore, Md.	1872
Fairbank, Henry Carleton	Flint, Mich.	1869
Fairbanks, J. R.	Ashfield, Mass.	1872
Farnham, G. B.	New Haven, Conn.	1872
Farnham, Horace P.	New York, N. Y.	1864
Fay, John	Williamsburg, Pa.	1858
Fearing, Elisha P.	Nantucket, Mass.	1849
Feicht, B.	Allegheny City, Pa.	1872
Felter, Mahlon	Troy, N. Y.	1870
†Fenner, E. D. V. P. [d. 1866]	New Orleans, La.	1851
Fenwick, G. P.	Washington, D. C.	1866
Ferguson, James	Glen's Falls, N. Y.	1864
†Fernald, John S.	Dover, N. H.	1849
Ferris, Anson S.	San Francisco, Cal.	1871
Fessenden, C. S. D.	Portland, Me.	1853
Field, C. C.	Leominster, Mass.	1864
Field, Henry M.	Newton, Mass.	1870
Finch, C. M.	Portsmouth, Ohio.	1868
Finch, J. A.	Westfield, N. J.	1872
Finch, J. E.	Hastings, Minn.	1872
Findley, Wm. Martin	Altoona, Pa.	1869
Findley, W. R.	Altoona, Pa.	1855
Finley, S. Moore	Harrisburg, Pa.	1872
Finley, W. M.	Clarksville, Tenn.	1872
Finnell, Thomas C.	New York, N. Y.	1855
Fischer, Emil	Philadelphia, Pa	1863
†Fish, Augustine H. [d. 1872]	Philadelphia, Pa.	1858
†Fishback, Charles [d. 1861]	Shelbyville, Ind.	1859
Fisher, Alexander	Chicago, Ill.	1863

Fisher, C. H.	North Scituate, R. I.	1858
Fisher, George J.	Sing Sing, N. Y.	1858
Fisher, John Adams Gideon	New Orleans, La.	1869
Fisler, Samuel	Clayton, N. J.	1870
Fiske, Henry M.	Sutter Creek, Cal.	1871
Fitch, Geo. A.	Washington, D. C.	1870
Fitch, Simon	Portland, Me.	1870
Fitch, Thomas Davis	Chicago, Ill.	1856
†Flagg, Beling	Charleston, S. C.	1851
Flint, Austin, v. p.	New York, N. Y.	1847
Flint, Austin, Jr.	New York, N. Y.	1860
Flint, John S.	Boston, Mass.	1865
†Folsom, Levi	New York, N. Y.	1855
Follett, A.	Granville, Ohio.	1872
†Fonerden, John [d. 1869]	Baltimore, Md.	1848
†Foote, H. E. [d. 1871]	Cincinnati, Ohio.	1859
Forbes, Wm. S.	Philadelphia, Pa.	1872
Ford, C. M.	Washington, D. C.	1865
†Ford, John D. [d. 1867]	Winona, Minn.	1855
Forsyth, F. F.	Weymouth, Mass.	1870
Forsyth, James B.	Weymouth, Mass.	1850
Foster, F. P.	New York, N. Y.	1872
Foster, Thomas A.	Portland, Me.	1865
Foulke, Joseph	Buckingham, Pa.	1872
†Fountain, E. J. [d. 1862]	Davenport, Iowa.	1860
Fourgeaud, Victor J.	San Francisco, Cal.	1871
Fournier, Edmund Henry	Mobile, Ala.	1869
†Fowler, Ezekiel [d. 1863]	Woonsocket Falls, R. I.	1848
Fox, W. R.	San Leandro, Cal.	1863
†Francis, E. C. [d. 1856]	Keokuk, Iowa.	1856
†Francis, John W. [d. 1861]	New York, N. Y.	1847
Frank, S. L.	Baltimore, Md.	1872
Franklin, John J.	Sonora, Cal.	1871
Franzoni, C. W.	Washington, D. C.	1872
French, Jno. O.	Hanover, Mass.	1854
†Frick, Charles [d. 1860]	Baltimore, Md.	1855
Fricke, Albert	Philadelphia, Pa.	1872
Friedenwald, A.	Baltimore, Md.	1870
†Fries, George [d. 1866]	Cincinnati, Ohio.	1850
Frissell, John	Wheeling, W. Va.	1850
†Fronefield, Charles	Philadelphia, Pa.	1849

†Frost, Henry R. V. P. [d. 1866]	Charleston, S. C.	1849
Frye, Joseph C.	Peoria, Ill.	1847
Gadbury, Wm. Young	Yazoo City, Miss.	1869
Gaillard, Edwin Samuel	Louisville, Ky.	1869
†Gaillard, Peter Cordes	Charleston, S. C.	1848
Gaines, Edmund Pendleton	Mobile, Ala.	1869
†Gallaher, William [d. 1860]	Philadelphia, Pa.	1858
Gallaher, Thos. J.	Pittsburg, Pa.	1866
Galloway, Charles Betts	Canton, Miss.	1869
†Gardner, E. C. [d. 1870]	Vermont, Ill.	1863
†Gardner, Johnson	Providence, R. I.	1860
Garland, G. W.	Lawrence, Mass.	1853
Garnett, Alexander Y. P.	Washington, D. C.	1852
Garretson, F.	Baltimore, Md.	1868
Garrish, John Pool	New York, N. Y.	1853
Garvin, Lucius Fayette C.	Lonsdale, R. I.	1871
†Gaston, Ephraim	Morristown, Ohio.	1858
Gates, Horatio S.	San Francisco, Cal.	1871
Gates, V. B.	San Francisco, Cal.	1871
Gauntt, Franklin	Burlington, N. J.	1867
Gaylord, L. Merriman	Sodus, N. Y.	1860
†Gazzam, Joseph P.	Pittsburg, Pa.	1853
Gebhard, Lewis P.	Philadelphia, Pa.	1864
Geddings, E. V. P.	Charleston, S. C.	1851
Gemmill, J. M.	Altoona, Pa.	1855
Gemmill, Jr. J. M.	Tyrone, Pa.	1872
†Gerhard, Wm. W. [d. 1872]	Philadelphia, Pa.	1848
German, F.	Baltimore, Md.	1872
Gerstell, A. F.	New Creek, Va.	1870
Gerwe, F. A. J.	Cincinnati, Ohio.	1867
Getchell, F. H.	Philadelphia, Pa.	1870
Gibbs, Robert W.	Columbia, S. C.	1857
†Gibbon, J. H. [d. 1869]	Charlotte, N. C.	1858
Gibbons, Henry, V. P.	San Francisco, Cal.	1871
Gibbons, Jr. Henry	San Francisco, Cal.	1871
†Gibson, Charles Bell [d. 1865]	Richmond, Va.	1847
†Gibson, William [d. 1868]	Philadelphia, Pa.	1848
†Gilbert, David [d. 1868]	Philadelphia, Pa.	1850
Gilchrist, Robert S.	De Graff, Ohio.	1850
Gillett, Buckland	Franklin, Pa.	1869

†Gilman, Chandler R. [d. 1866]	New York, N. Y.	1847
Gilman, Judson	Baltimore, Md.	1855
Gindrat, A.	Montgomery, Ala.	1872
Gobrecht, Wm. H.	Cincinnati, Ohio,	1853
†Goddard, Paul Beck [d. 1866]	Philadelphia, Pa.	1855
Golding, Walter S.	St. Louis, Mo.	1854
Gomez, Horatio	New York, N. Y.	1858
†Gooch, P. Claiborne, s.	Richmond, Va.	1851
Goodell, George	Sykesville, N. J.	1855
Goodell, Wm.	Philadelphia, Pa.	1872
Goodman, H. Earnest	Philadelphia, Pa.	1872
Goodrich, C. G.	Minneapolis, Minn.	1872
†Goodsell, Thomas [d. 1864]	Utica, N. Y.	1849
Goodwillie, D. H.	New York, N. Y.	1872
Gordon, Seth C.	Portland, Me.	1872
†Gould, Augustus A. [d. 1866]	Boston, Mass.	1849
†Gourdin, Samuel	New Haven, Conn.	1858
Govan, Wm.	Stony Point, N. Y.	1860
Graff, Milton B.	Cincinnati, Ohio.	1865
†Grafton, Thomas J.	Rodney, Miss.	1854
†Graham, J. N.	Chicago, Ill.	1859
†Grant, Wm. R. [d. 1852]	Philadelphia, Pa.	1848
Gray, John P.	Utica, N. Y.	1870
Gray, R. M.	Stratford, Conn.	1870
Green, Caleb	Homer, N. Y.	1853
Green, Francis C.	E. Hampton, Mass.	1860
†Green, Horace [d. 1866]	New York, N. Y.	1847
†Green, Isaac [d. 1864]	New York, N. Y.	1847
†Green, John, V. P.	Worcester, Mass.	1848
Green, John O.	Lowell, Mass.	1858
Green, J. O.	Boston, Mass.	1870
Green, J. S.	Elizabeth, N. J.	1872
Green, Traill	Easton, Pa.	1853
Gregg, J. S.	Ft. Wayne, Ind.	1867
Gregory, E. H.	St. Louis, Mo.	1872
Grimes, J. H.	Baltimore, Md.	1870
Griscom, John H.	New York, N. Y.	1847
Grissom, W. W.	St. Louis, Mo.	1870
Griswold, E.	Sharon, Pa.	1872
Groesbeck, Abraham	Chicago, Ill.	1869
Gronard, John Hanson	Allegheny City, Pa.	1869

Gross, Samuel D.	Philadelphia, Pa.	1850
Grove, J. H.	Philadelphia, Pa.	1867
Grover, Wm. A.	San Francisco, Cal.	1871
Grice, Napoleon Lorenzo	Fayette, Miss.	1869
Gruel, Louis	Philadelphia, Pa.	1868
Guth, I. J.	Peoria, Ill.	1872
Hagner, Chas. E.	Washington, D. C.	1870
Hagner, Daniel R.	Washington, D. C.	1858
Haight, C. W.	Pleasantville, N. Y.	1860
Haine, Jos.	San Francisco, Cal.	1871
Halberstadt, A. H.	Pottsville, Pa.	1872
†Halberstadt, George	Pottsville, Pa.	1855
Hale, Ashbel B.	Norwich, Conn.	1849
†Hale, Enoch [d. 1848]	Boston, Mass.	1848
Hall, A. Douglass	Philadelphia, Pa.	1872
Hall, David	Lewes, Del.	1872
Hall, W. R.	St. Joseph, Mo.	1872
Hale, Jr. George	Philadelphia, Pa.	1872
Hale, Josiah	Owensboro, Ky.	1869
†Hall, Charles	Burlington, Vt.	1847
†Hall, Edward [d. 1870]	Auburn, N. Y.	1860
†Hall, Eli	East Hartford, Conn.	1849
Hall, James C.	Washington, D. C.	1855
Hall, Newton B.	Branford, Conn.	1865
Haller, F. B.	Vandalia, Ill.	1859
†Hallowell, Edward	Philadelphia, Pa.	1849
Halsey, Calvin C.	Montrose, Pa.	1864
Halsey, G. L.	Unadilla, N. Y.	1872
Halsey, W. S.	Philadelphia, Pa.	1858
Hamill, R. C.	Chicago, Ill.	1863
†Hamilton, Cyrus B.	Lyme, N. H.	1849
Hamilton, George	Philadelphia, Pa.	1872
Hamilton, Horace	National, Iowa.	1865
Hamilton, Joseph Ormond	Jerseyville, Ill.	1867
Hamilton, Wm.	Odessa, Del.	1872
Hammer, A.	St. Louis, Mo.	1867
Hammond, Cornelius E.	Portland, Conn.	1872
†Hampton, Isaac H.	Bridgeton, N. J.	1855
†Hancock, F. W. [d. 1865]	Richmond, Va.	1852
Hand, D. W.	St. Paul, Minn.	1860

†Handy, John H. [d. 1853]	Philadelphia, Pa.	1845
†Handy, Samuel K. [d. 1859]	Princess Anne, Md.	1843
Hansman, Theodore	Washington, D. C.	1868
Harding, Abraham	South Hero, Vt.	1865
Harding, Myron H.	Lawrenceburg, Ind.	1859
Hardy, Benjamin	San Francisco, Cal.	1871
Harlan, David, U. S. N.	Churchville, Md.	1866
Harlan, George C.	Philadelphia, Pa.	1872
Harlow, Lewis D.	Philadelphia, Pa.	1872
†Harpur, John	Sandwich, Mass.	1849
†Harriman, H. C. [d. 1863]	Jerseyville, Ill.	1856
Harrington, J. F.	Jackson, Miss.	1870
Harris, A. J.	Hellertown, Pa.	1870
†Harris, Chapin A.	Baltimore, Md.	1843
Harris, Elisha	New York, N. Y.	1853
Harris, Robert P.	Philadelphia, Pa.	1872
Harrison, B. F.	Wallingford, Conn.	1870
†Harrison, David	Middletown, Conn.	1855
Harrison, F. C.	Lewisburg, Pa.	1860
†Harrison, J.	New Orleans, La.	1847
†Harrison, John Pollard, V. P [d. 1848]	Cincinnati, Ohio.	1848
†Harry, Samuel M. [d. 1868]	Bayview, Md.	1866
Hart, B. F.	Marietta, Ohio.	1872
Hart, Charles A.	New York, N. Y.	1870
†Hart, John [d. 1867]	New York, N. Y.	1849
Hart, Samuel	Brooklyn, N. Y.	1849
Hartman, Andrew	Baltimore, Md.	1866
Hartshorne, Edward	Philadelphia, Pa.	1853
Hartshorne, Henry	Philadelphia, Pa.	1855
Harvey, Obed	Galt, Cal.	1858
Harvey, Thomas B.	Marion, Ind.	1867
Harwood, E. C.	New York, N. Y.	1872
Hasbrouck, Charles	Hackensack, N. J.	1866
Haskell, Benjamin	Rockport, Mass.	1849
†Haskins, E. B. [d. 1868]	Nashville, Tenn.	1850
Hatch, Fred. W.	Sacramento, Cal.	1871
†Hatch, Johnson C.	Kent, Conn.	1847
Hatfield, Nathan L.	Philadelphia, Pa.	1848
Haughton, R. E.	Richmond, Ind.	1859
Haven, Jonathan	Newton, N. J.	1865

†Hawley, Joel Edwin [d. 1859]	Ithaca, N. Y.	1849
†Haxall, Robt. Wm. [d. 1872]	Richmond, Va.	1847
Hay, Thomas	Philadelphia, Pa.	1866
Hays, I. Minis	Philadelphia, Pa.	1872
Hayes, Joseph Byron	Canandaigua, N. Y.	1865
†Hayward, Geo. V. P. [d. 1863]	Boston, Mass.	1849
Haywood, Jr. F. J.	Raleigh, N. C.	1870
†Hazell, Andrew	All Saints, S. C.	1851
Hazen, E. H.	Davenport, Iowa.	1872
Hazen, Miner C.	Haddam, Conn.	1864
Hazlett, Robert W.	Wheeling, W. Va.	1870
Healey, Thomas M.	Cumberland, Md.	1870
Heard, Thos. Jefferson, V. P.	Galveston, Texas.	1867
Heighway, Archibald E.	Cincinnati, Ohio.	1858
Heinstreet, Thos. Brinsmade	Troy, N. Y.	1868
†Heintze, F. E. B. V. P. [d. '65]	Baltimore, Md.	1848
†Heister, J. P.	Reading, Pa.	1852
†Hellen, B. Johnson [d. 1864]	Washington, D. C.	1855
Helmick, Joseph	Harrisburg, Ohio.	1859
Helms, John H.	Peru, Ind.	1871
Helsby, Thos. H.	Williamsport, Pa.	1866
Henderson, A. A.	Charleston, Mass.	1870
†Henderson, Eugene [d. 1867]	Murfreesboro', Tenn.	1858
Henderson, J. P.	Newville, Ohio.	1856
Henderson, Wm.	Mobile, Ala.	1872
Henderson, Wm. Warton	Covington, Ky.	1869
Hendrick, H. C.	McGrawville, N. Y.	1860
†Hendry, Chas. D. [d. 1869]	Camden Co., N. J	1849
Henkell, E. J.	Baltimore, Md.	1872
Henry, Morris H.	New York, N. Y.	1870
Henschel, Charles	New York, N. Y.	1853
Hensly, John W.	Yates City, Ill.	1870
Hereford, Francis Mason	Montgomery, Ala.	1869
Herr, A. J.	Lancaster, Pa.	1872
†Herrick, Josiah B. [d. 1849]	Vandalia, Ill.	1848
Herrick, Stephen Solon	New Orleans, La.	1869
†Herrick, W. B. [d. 1865]	Chicago, Ill.	1854
Herron, W. M.	Allegheny, Pa.	1870
Herzog, Max	New York, N. Y.	1872
Hess, W. H.	Nebraska City, Neb.	1872
Heustis, James Fountain	Mobile, Ala.	1869

Hewins, L. T.	Loda, Ill.	1865
Hewit, R. C.	Louisville, Ky.	1859
Hewitt, Chas. Nathaniel	Redwing, Minn.	1869
Hewitt, Geo. W.	Franklin Grove, Ill.	1871
Hewson, Addinell	Philadelphia, Pa.	1855
Hewston, George	San Francisco, Cal.	1871
Heywood, Benjamin F.	Worcester, Mass.	1853
Hibberd, James Farquhar, V. P.	Richmond, Ind.	1864
Hickman, Thos. Gideon	Vandalia, Ill.	1869
†Hiester, Frank M. [d. 1864]	Reading, Pa.	1853
Higday, Tompkins	Laporte, Ind.	1863
Hildreth, Chas. C.	Zanesville, Ohio.	1867
Hildreth, E. A.	Wheeling, West Va.	1850
†Hildreth, Joseph S. [d. 1869]	Chicago, Ill.	1867
Hill, Edwin A.	East Killingly, Conn.	1864
Hill, L. S.	Neville, Ohio.	1867
Hill, Nathan B.	Minneapolis, Minn.	1871
Hills, T. Morton	Willimantic, Conn.	1870
Hilliard, John F.	Evansville, Ind.	1871
Hinkle, A. G. B.	Philadelphia, Pa.	1872
Hirons, R. S. W.	Smyrna, Del.	1864
Hitchcock, Homer O.	Kalamazoo, Mich.	1863
Hodgdon, Richard L.	Arlington, Mass.	1860
Hodge, Charles	Trenton, N. J.	1872
Hodge, H. Lenox	Philadelphia, Pa.	1870
Hodge, Hugh L.	Philadelphia, Pa.	1848
Hodge, J. A.	Henderson, Ky.	1859
Hodgen, John T.	St. Louis, Mo.	1867
†Hofey, Thomas [d. 1853]	Columbus, Ga.	1853
Hoffman, Daniel B.	San Diego, Cal.	1871
Holcomb, William Frederic	New York, N. Y.	1858
Holden, Edgar	Newark, N. J.	1866
Holland, J. W.	Louisville, Ky.	1872
Holloway, Jas. Montgomery	Louisville, Ky.	1869
†Holmes, Daniel [d. 1869]	Elmira, N. Y.	1863
Holston, Sr. J. G. F.	Washington, D. C.	1872
Holston, Jr. John G. F.	Zanesville, Ohio.	1855
Holt, W. F.	Macon, Ga.	1870
Holton, Henry D.	Brattleboro, Vt.	1864
†Homans, John [d. 1868]	Boston, Mass.	1849
†Hook, J. H. [d. 1861]	St. Matthew's, S. C.	1851

†Hooker, Charles [d. 1863]	New Haven, Conn.	1850
†Hooker, Worth'gton [d. 1868]	New Haven, Conn.	1849
Horr, Asa	Dubuque, Iowa.	1857
Hopkins, Ephraim	Marshalton, Pa.	1872
†Hopkins, Joel [d. 1868]	Howard, Co. Md.	1847
Horner, Jr. Fred.	Salem, Va.	1870
†Horner, Wm. E. [d. 1853]	Philadelphia, Pa.	1849
Horton, George F.	Terrytown, Pa.	1858
Hosmer, Alfred	Watertown, Mass.	1865
†Hosmer, Hiram	Watertown, Mass.	1849
Hovey, Ariel B.	Tiffin City, Ohio.	1871
Hovey, B. L.	Rochester, N. Y.	1858
Howard, Benj.	New York, N. Y.	1867
Howard, E. Lloyd	Baltimore, Md.	1870
Howard, E. W.	Akron, Ohio.	1870
Howard, Flodoardo	Washington, D. C.	1847
†Howard, Richard L. v. p.	Columbus, Ohio.	1848
Howard, Wm. T.	Baltimore, Md.	1870
†Howe, Zadoc	Billerica, Mass.	1849
Howell, Samuel B.	Philadelphia, Pa.	1872
Hoy, P. R.	Racine, Wis.	1870
Hubbard, Charles H.	Essex, Conn.	1870
Hubbard, George H.	Lansinburgh, N. Y.	1858
Hubbard, Robert	Bridgeport, Conn.	1853
Hubbard, Samuel T.	New York, N. Y.	1847
Hubbard, Stephen G. s.	New Haven, Conn.	1849
Huestis, Isaac	Chester Hill, Ohio.	1856
Hughes, Edward Wm.	Granada, Miss.	1869
Hughes, Francis Marion	Nashville, Tenn.	1869
Hughes, J. C.	Keokuk, Iowa.	1853
Hull, W. R.	Williamsport, Pa.	1870
†Humes, Samuel [d. 1853]	Lancaster, Pa.	1848
Hun, Edward R.	Albany, N. Y.	1870
Hun, Thomas	Albany, N. Y.	1853
†Hunkins, Seth C.	Windham, Maine	1860
Hunt, Ebenezer	Davenport, Mass.	1849
Hunt, Ebenezer K.	Hartford, Conn.	1860
Hunt, Ezra M.	Metuchen, N. J.	1864
Hunt, William	Philadelphia, Pa.	1859
Hunter, D.	Tamaqua, Pa.	1872
Hunter, James B.	New York, N. Y.	1870

†Huntington, Elisha	Lowell, Mass.	1847
Hupp, John Cox	Wheeling, W. Va.	1863
Hurd, Henry Sterling	Galesburg, Ill.	1860
Hurd, Yorick G.	Amesbury, Mass.	1865
Hurlbut, H. N.	Chicago, Ill.	1863
Hurlbut, V. L.	Chicago, Ill.	1863
†Hurxthal, Fred. T. [d. 1863]	Massillon, Ohio.	1856
†Huse, Stephen	Methuen, Mass.	1855
Huselton, W. S.	Allegheny, Pa.	1872
Husted, Nathaniel C.	New York, N. Y.	1856
†Huston, Robert M.	Philadelphia, Pa.	1848
Hutchinson, James Howell	Philadelphia, Pa.	1864
Hutchison, J. C.	Troy, N. Y.	1872
Hutchison, Joseph C.	Brooklyn, N. Y.	1855
†Huxley, A. M. [d. 1864]	Goshen, Conn.	1853
Hyde, Frederick	Cortlandville, N. Y.	1847
Hyde, George S.	Boston, Mass.	1865
Irion, J. L.	Montgomery, Texas.	1870
Isham, Ralph N.	Chicago, Ill.	1859
Isom, Thos. Dudley	Oxford, Miss.	1869
Ives, Charles L., V. P.	New Haven, Conn.	1865
†Ives, Eli. S.; P. [d. 1861]	New Haven, Conn.	1847
Ives, R. S.	New Haven, Conn.	1870
†Jackson, James [d. 1867]	Boston, Mass.	1849
Jackson, James C.	Hartford, Conn.	1865
Jackson, J. B. S.	Boston, Mass.	1849
Jackson, John Davies	Danville, Ky.	1867
†Jackson, R. M. S. [d. 1865]	Cresson, Pa.	1855
†Jackson, Samuel (Prof.) [d. '72]	Philadelphia, Pa.	1847
†Jackson, Samuel [d. 1869]	Philadelphia, Pa.	1847
Jacobi, Abraham	New York, N. Y.	1860
Jacobs, Ferris	Delhi, N. Y.	1853
Jameson, E. W.	Reading, Pa.	1872
†Jameson, Sen. Horatio G.	Baltimore, Md.	1848
Jamison, J. M.	Nashville, Tenn.	1870
Janes, Henry	Waterbury, Vt.	1871
†Janney, Benj. Say [d. 1859]	Philadelphia, Pa.	1847
Jansen, A. F. D.	Buffalo, N. Y.	1870
Jarvis, Geo. C.	Hartford, Conn.	1872

†Jarvis, N. S.	U. S. Army.	1853
Jenkins, J. Foster	Yonkers, N. Y.	1853
†Jenkins, Solomon M. [d. '49]	Easton, Md.	1847
Jenks, Edward Watrous	Detroit, Mich.	1863
Jenks, Wm. F.	Philadelphia, Pa.	1872
Jennings, J. D.	Sonora, Ohio.	1872
Jennings, Roscoe Greene	Little Rock, Ark.	1869
†Jennings, Selden	Richmond, Mass.	1848
†Jewell, Wilson, V. P. [d. 1868]	Philadelphia, Pa.	1847
Jewett, Harvey	Canandaigua, N. Y.	1848
Jobs, Eugene	Springfield, N. J.	1858
Johnson, B. P.	Alliance, Ohio.	1872
†Johnson, Carter P.	Richmond, Va.	1847
†Johnson, Charles	York, Ill.	1859
Johnson, John B., V. P. .	St. Louis, Mo.	1847
Johnson, Joe Henry	Talladega, Ala.	1868
Johnson, Joseph Taber	Washington, D. C.	1868
Johnson, R. P.	Wilmington, Del.	1858
Johnson, W.	New York, N. Y.	1872
Johnson, W. H.	San Francisco, Cal.	1871
Johnson, W. W.	Washington, D. C.	1870
Johnston, Christopher	Baltimore, Md.	1855
Johnston, Egbert Beale	Tuskegee, Ala.	1870
Johnston, John Foote	Montgomery, Ala.	1870
Johnston, W. B.	Washington, D. C.	1872
Johnston, Wm. P., V. P.	Washington, D. C.	1848
Jones, Andrew Barry	Portsmouth, Ohio.	1868
Jones, B. Rush	Montgomery, Ala.	1872
Jones, Charles H.	Baltimore, Md.	1866
†Jones, Daniel T. [d. 1861]	Baldwinsville, N. Y.	1852
Jones, Eusebius Lee	New York, N. Y.	1858
Jones, Joseph	New Orleans, La.	1859
Jones, Samuel J.	Chicago, Ill.	1868
†Jones, Wm. [d. 1867]	Washington, D. C.	1858
Jones, W. W.	Toledo, Ohio.	1856
Joynes, Levin S.	Richmond, Va.	1847
Judd, Homer	St. Louis, Mo.	1869
†Judkins, William	Cincinnati, Ohio.	1848
Jump, Isaac	Dover, Del.	1848
Kammerer, Jos.	New York, N. Y.	1870

Kane, Edward	Detroit, Mich.	1871
Keating, William V.	Philadelphia, Pa.	1853
Kedzie, R. C.	Lansing, Mich.	1872
Keen, Wm. W.	Philadelphia, Pa.	1872
Keller, James M.	Louisville, Ky.	1859
Kelly, Edward	San Francisco, Cal.	1871
Kelley, Wm. Dennis	Galveston, Texas.	1869
Kemp, J. D.	Dayton, Ohio.	1867
Kendall, H. W.	Quincy, Ill.	1872
Kendall, J. E.	Wirt, W. Va.	1872
†Kendall, Pierson T.	Clinton, Mass.	1859
Kennedy, Philip	Deavertown, Ohio.	1872
Kenyon, Job	Providence, R. I.	1860
†Kerfoot, George B.	Lancaster, Pa.	1847
Kerlin, Isaac N.	Media, Pa.	1865
Kerr, James W.	York, Pa.	1843
Keyser, P. D.	Philadelphia, Pa.	1870
Kieffer, S. B.	Carlisle, Pa.	1872
Kindleberger, David	U. S. Navy.	1871
King, Albert F. A.	Washington, D. C.	1866
King, David	Newport, R. I.	1870
King, Geo. A.	Lancaster, Pa.	1871
King, James	Pittsburg, Pa.	1866
King, James Stebbins	Natchez, Miss.	1863
Kinlock, R. A.	Charleston, S. C.	1853
Kinnemon, Perry S.	Baltimore, Md.	1853
Kipp, C. J.	Newark, N. J.	1872
†Kissam, R. S.	New York, N. Y.	1847
†Klapp, Wm. Henry [d. 1855]	Philadelphia, Pa.	1849
Klein, P.	Detroit, Mich.	1856
Kleinschmidt, C. H. A.	Washington, D. C.	1872
Klueber, C. W.	Washington, D. C.	1872
Knapp, Herman	New York, N. Y.	1870
†Knight, E. A. [d. 1872]	Springfield, Vt.	1864
Knight, Henry M.	Lakeville, Conn.	1864
†Knight, Jonathan, V. P.; P. [d. 1864]	New Haven, Conn.	1847
Knight, Wm. L.	Philadelphia, Pa.	1858
Knox, S. B. P.	Brownsville, Pa.	1872
Knox, W. A.	Chicago, Ill.	1872
Knox, Wm. F.	McKeesport, Pa.	1870

†Knox, Wm. Morrow	Baumstown, Pa.	1860
†Koehne, H. F.	Dayton, Ohio.	1857
Koerper, J. F.	Philadelphia, Pa.	1872
Kollock, John M.	San Francisco, Cal.	1871
Krackowizer, Ernest	New York, N. Y.	1855
Kuhn, L. De B.	Reading, Pa.	1872
Kurtz, S. L.	Reading, Pa.	1872
Ladd, Horace	Scranton, Pa.	1872
†Lajus, D. Paul	Philadelphia, Pa.	1851
†Lamb, John F. [d. 1869]	Frankford, Pa.	1851
Lamphier, A. H.	Atchison, Kansas.	1872
Lancaster, F. M.	Harris' Lot, Md.	1870
Landis, Henry	Marietta, Pa.	1870
Lane, Levi Cooper	San Francisco, Cal.	1871
Lane, Samuel G.	Chambersburg, Pa.	1872
†Lang, Edmund	Philadelphia, Pa.	1851
Langan, D.	De Witt, Iowa.	1872
Langdon, Oliver M.	Cincinnati, Ohio.	1850
Langfitt, W. J.	Beaver, Pa.	1870
Langhorn, D. A.	Lynchburg, Va.	1870
Langworthy, Owen Palmer	Clinton, La.	1869
Lankford, A. P.	Kansas City, Mo.	1870
Lansdale, Philip	U. S. Navy.	1871
Larimore, F. C.	Mt. Vernon, Ohio.	1872
La Roche, Rene	Philadelphia, Pa.	1847
La Roche, C. Percy	Philadelphia, Pa.	1858
Latham, Henry	Lynchburg, Va.	1870
Latimer, Thos. S.	Baltimore, Md.	1870
Lawrence, Geo. W.	Hot Springs, Ark.	1855
Lawrence, Jonathan S.	New York, N. Y.	1853
†Lawrence, L. M.	Cincinnati, Ohio.	1850
Lay, J. Cochran	Dubuque, Iowa.	1872
Lazzell, James M.	Fairmont, W. Va.	1868
Leach, Alonzo L.	Philadelphia, Pa.	1870
Leale, Chas. A.	New York, N. Y.	1870
Leaman, Brainard	Leaman Place, Pa.	1872
Leaman, Henry	Philadelphia, Pa.	1872
Learned, E. T.	Fall River, Mass.	1872
Leasure, D.	Allegheny, Pa.	1872
†Leavenworth, Melinus C.	Waterbury, Conn.	1860

Lebby, Robert	Charleston, S. C.	1849
†Le Boutillier, Charles W.	St. Anthony, Minn.	1856
Lee, Benjamin	Philadelphia, Pa.	1863
†Lee, Charles Alfred [d. 1872]	Peekskill, N. Y.	1847
Lee, Chas. Carroll	New York, N. Y.	1872
†Lee, James [d. 1866]	Mechanicsville, N. Y.	1864
Lee, William, L.	Washington, D. C.	1866
Leedy, J. K.	Warsaw, Ind.	1850
†Leib, Henry F. [d. 1856]	Philadelphia, Pa,	1848
Leidy, Joseph	Philadelphia, Pa.	1854
Leidy, Philip	Philadelphia, Pa.	1870
†Leland, Aaron L. [d. 1858]	Detroit, Mich.	1853
Lemoine, E. S. s.	St. Louis, Mo.	1853
Le Moyne, F.	Allegheny, Pa.	1872
Lenoir, B. B.	Lenoir, Tenn.	1849
Leonard, B. B.	West Liberty, Ohio.	1855
†Leonard, S. E.	New Albany, Ind.	1850
Lester, T. B.	Kansas City, Mo.	1872
†Letcher, Robert P. [d. 1867]	Henderson, Ky.	1859
Levick, James J.	Philadelphia, Pa.	1864
Lewis, Fred. W.	Philadelphia, Pa.	1868
†Lewis, R. S. [d. 1870]	Dubuque, Iowa.	1856
Lewis, Samuel	Philadelphia, Pa.	1851
Lieberman, Charles H.	Washington, D. C.	1858
Lilly, Samuel	Lambertville, N. J.	1866
†Lincoln, Isaac [d. 1868]	Brunswick, Me.	1849
Lincoln, N. S.	Washington, D. C.	1866
Linde, Christian	Oshkosh, Wis.	1872
Lindsley, John Berrien	Nashville, Tenn.	1851
Lindsly, Harvey, P.	Washington, D. C.	1847
Lineaweaver, J. K.	Columbia, Pa.	1872
Little, J. A.	Delwaware, Ohio.	1872
Little, J. H.	West Alexander, Pa.	1872
Little, James L.	New York, N. Y.	1864
†Little, William B. [d. 1867]	San Francisco, Cal.	1860
Logan, C. A.	Leavenworth, Kan.	1863
Logan, Joseph P. V. P.	Atlanta, Ga.	1863
Logan, Samuel	New Orleans, La.	1869
Logan, Thomas M. V. P., P.	Sacramento, Cal.	1865
Lomax, William	Marion, Ind.	1850
Lombard, J. S.	Boston, Mass.	1865

Long, Alfred J.	Whitehall, N. Y.	1864
Long, Isaac S.	Englishtown, N. J.	1872
†Long, Samuel [d. 1863]	Springfield, Ill.	1854
Longenecker, J. H.	Brooklyn, N. Y.	1865
Longfellow, A. J.	Fostoria, Ohio.	1870
Loughlin, J. Eneu	Philadelphia, Pa.	1872
Longstreet, Henry H.	Bordentown, N. J.	1855
Lovejoy, J. W. H. s.	Washington, D. C.	1864
Lowe, John T.	Aberdeen, Miss.	1857
Lowman, John	Johnstown, Pa.	1853
Luck, J. T.	New York, N. Y.	1872
†Luden, J. B.	Huntingdon, Pa.	1856
Ludlow, J. L.	Philadelphia, Pa.	1855
Ludlum, Wm. S.	New York, N. Y.	1865
Lusk, Wm. T.	New York, N. Y.	1872
†Lyman, Norman [d. 1851]	Warren, Conn.	1849
Lynch, John S.	Baltimore, Md.	1872
Lynde, James P.	Athol, Mass.	1863
†Lyon, G. Gallatin	Jerseyville, Ill.	1867
Lyons, J. E.	Huntingdon, Pa.	1872
Lyon, Thomas	Williamsport, Pa.	1872
†McAllister, Asa	Ellsworth, Me.	1856
McArn, Wm. Torrey	Union Church, Miss.	1869
McArthur, A. L.	Rockford, Ill.	1856
†McCall, John [d. 1867]	Utica, N. Y.	1847
McCann, James	Pittsburg, Pa.	1870
McCaw, James B.	Richmond, Va.	1852
McClellan, J. H. B.	Philadelphia, Pa.	1849
McClelland, W. F.	Denver, Col.	1872
†McCloskey, Lawrence Aurelius	Mobile, Ala.	1869
McClurg, John R.	West Chester, Pa.	1858
McConaughy, D. W.	Latrobe, Pa.	1872
McConaughy, James	Mt. Pleasant, Pa.	1866
McDaniel, Edward Davis	Camden, Ala.	1869
McDonald, N.	Pittsburg, Pa.	1868
McDowell, J. J.	St. Louis, Mo.	1867
†McDowell, J. N. v. P. [d. '68]	St. Louis, Mo.	1854
McDowell, W. J.	Portsmouth, Ohio.	1867
McElbright, Thomas	Akron, Ohio.	1867

†McElhenny, S. W.	Wheeling, W. Va.	1847
†McEwen, John B. [d. 1867]	New York, N.Y.	1860
McFarland, J. A.	Tiffin City, Ohio.	1857
McFarland, S. F.	Oxford, N. Y.	1872
McFeely, James	St. Anthony, Minn.	1870
McGaughey, J. B.	Winona, Minn.	1872
McGill, J. D.	Jersey City, N. J.	1872
†McGill, Geo. M.	Baltimore, Md.	1866
McGregor, Gregor Carmichael	Wesley, Texas.	1869
†McGregor, John [d. 1868]	Thompson, Conn.	1864
McGregor, J. R.	New York, N. Y.	1872
†McGugin, D. L.	Keokuk, Iowa.	1854
McGuire, Hunter	Richmond, Va.	1872
McIlvaine, Robert R.	New York, N. Y.	1850
†McIntyre, Alexander	Palmyra, N. Y.	1852
McKennon, Henry	Sauk City, Wis.	1870
McKennon, Thomas	Washington, Pa.	1869
McKew, Dennis I.	Baltimore, Md.	1858
McKinley, Hays	Kenosha, Wis.	1856
McKim, S. A. H.	Washington, D. C.	1866
McLanahan, John	Norwood, Ill.	1871
McLaughlin, A. C.	Tremont, Ohio.	1872
McLean, Leroy	Troy, N. Y.	1870
McLeod, S. B. W.	New York, N. Y.	1872
†McMeens, R. R. [d. 1864]	Sandusky, Ohio.	1856
McNab, John	Woodville, N. H.	1872
McNally, Valentine	Washington, D. C.	1870
McNaughton, James	Albany, N. Y.	1847
†McNevin, Wm. H.	New York, N. Y.	1853
McNutt, Hiram	Warrensburg, N. Y.	1865
†McPhail, Leonard C. [d. '67]	Brooklyn, N. Y.	1853
McPheeters, W. Marcellus, V.P.	St. Louis, Mo.	1850
McRean, Thos. A.	Philadelphia, Pa.	1870
McReynolds, W. T.	Clarksville, Tenn.	1872
McVey, Richard E.	Waverly, Ill.	1864
Maddox, T. Clay	Baltimore, Md.	1870
Magill, W. H.	Danville, Pa.	1872
Magoffin, John	St. Louis, Mo.	1854
Mahon, Ormsby S.	Baltimore, Md.	1854
Manahan, Val.	Enfield, N. H.	1872

†Manlove, Joseph Edward [d. 1870]	Nashville, Tenn.	1857
†Manly, James, R. [d. 1851]	New York, N. Y.	1847
Marbury, William	Washington, D. C.	1865
†March, Alden, P. [d. 1869]	Albany, N. Y.	1847
†March, M. M. [d. 1868]	Manlius, N. Y.	1859
Marsh, Elias J.	Patterson, N. Y.	1872
Marshall, W.	Milford, Del.	1872
Martin, Henry A.	Boston, Mass.	1868
†Martin, Joshua	Xenia, Ohio.	1850
Masher, J. L.	New York, N. Y.	1872
Mason, Augustus	Brighton, Mass.	1865
Mason, Darius	Prairie du Chien, Wis.	1871
Mason, Edmunds	Wetumpka, Ala.	1870
Mason, Erskine	New York, N. Y.	1868
Mason, Lewis D.	Brooklyn, N. Y.	1870
†Massie, Hardin	Charlottesville, Va.	1847
Massie, Wm.	Dudley St., Ill.	1867
Matchett, J. F.	Brenham, Texas.	1869
†Mathews, Charles H.	Doylestown, Pa.	1849
Mathewson, Arthur	Brooklyn, N. Y.	1870
Maury, Francis F.	Philadelphia, Pa.	1872
Maury, Thos. F. [d. 1871]	Washington, D. C.	1866
Mayburry, William	Philadelphia, Pa.	1847
Mayo, W. W.	Rochester, Minn.	1870
Mays, J. F.	Washington, D. C.	1870
Mears, George W.	Indianapolis, Ind.	1850
Mears, J. Ewing	Philadelphia, Pa.	1870
Mehard, S. S.	Mercer, Pa.	1872
Mehring, Aben B.	Woodland, Cal.	1871
†Meigs, Charles D. [d. 1869]	Philadelphia, Pa.	1847
Meigs, James Aitken	Philadelphia, Pa.	1858
Meisel, H.	Elmira, N. Y.	1870
Mendenhall, George, V. P., P.	Cincinnati, Ohio.	1850
Mendenhall, Isaac	New Castle, Ind.	1857
Merrill, S. R.	Paterson, N. J.	1872
Merriweather, Geo. M.	Mathew's Station, Ala.	1870
Messenger, John	New York, N. Y.	1868
Metcalf, S. W.	Owego, N. Y.	1872
Michel, Richard Fraser, V. P.	Montgomery, Ala.	1858
†Middlebrook, Elijah	Trumbull, Conn.	1847

Miles, Francis T.	Baltimore, Md.	1859
Miller, A. J.	Paris, Ill.	1872
Miller, Aaron W.	Washington, D. C.	1870
Miller, Erasmus D.	Dorchester, Mass.	1853
Miller, D. P.	Huntingdon, Pa.	1872
Miller, Geo. R.	Washington, D. C.	1870
Miller, Henry, P.	Louisville, Ky.	1850
†Miller, John [d. 1862]	New York, N. Y.	1853
Miller, Robinson	Mobile, Ala.	1853
Miller, Thomas	Washington, D. C.	1847
†Miller, W. H.	Henderson, Ky.	1859
Millick, J. W.	Philadelphia, Pa.	1872
Mills, Chas. K.	Philadelphia, Pa.	1872
Mills, Charles S.	Richmond, Va.	1852
Mills, Edward	Ulster, Pa.	1872
Mills, Samuel Blackburn	Louisville, Ky.	1869
Miner, Julius F.	Buffalo, N. Y.	1864
†Miner, William [d. 1865]	New York, N. Y.	1864
Minor, T. C.	Cincinnati, Ohio.	1872
†Mitchell, Edward	Edisto, S. C.	1851
Mitchell, Henry	Jersey City, N. J.	1872
†Mitchell, Henry [d. 1856]	Norwich, N. Y.	1849
†Mitchell, John Kearsly [d. '58]	Philadelphia, Pa.	1847
†Mitchell, James R.	Milford, Del.	1855
Mitchell, L. C.	Brooklyn, N. Y.	1860
Mitchell, S. B. W.	Philadelphia, Pa.	1872
†Mitchell, Thomas D. [d. '64]	Philadelphia, Pa.	1847
Mitchell, Wm. Stanton	New Orleans, La.	1869
Monell, Joseph A.	New York, N. Y.	1855
†Monkur, John C. S. [d. 1867]	Baltimore, Md.	1848
Monmonier, John F.	Baltimore, Md.	1855
Montgomery, Edw.	St. Louis, Mo.	1872
Montgomery, John	Chambersburg, Pa.	1872
Montgomery, Jos. F.	Sacramento, Cal.	1871
Moody, H. Mont.	E. Smithfield, Pa.	1872
Moore, Chas F.	New Jersey.	1870
Moore, Edward B.	Boston, Mass.	1855
Moore, Edw. M.	Rochester, N. Y.	1849
Moore, Ely Herdman	Wellsburg, W. Va.	1871
Moore, Jonas Patrick	Yazoo, Miss.	1869
Moore, John S., V. P.	St. Louis, Mo.	1852

†Moore, John Wilson [d. 1865]	Philadelphia, Pa.	1847
Moore, Richard D.	Athens, Ga.	1851
Moore, W. J.	Norfolk, Va.	1852
Morgan, Gerard E. s.	Baltimore, Md.	1858
†Moriarty, John M.	Boston, Mass.	1849
Morland, William W.	Boston, Mass.	1849
Morrill, E. M.	Rochester, N. Y.	1870
Morrill, Samuel	Boston, Mass.	1849
Morris, F. B.	Philadelphia, Pa.	1872
Morris, John	Baltimore, Md.	1868
Morris, Moreau	New York, N. Y.	1864
†Morris, Philip V. N.	Buskirk's Bridge, N Y.	1856
Morris, Sidney R.	Philadelphia, Pa.	1868
†Morris, William W.	Dover, Del.	1847
Morse, Edward G.	Boston Highlands, Mass.	1870
Morton, J. C.	New York, N. Y.	1872
†Morton, Sam'l Geo. [d. 1851]	Philadelphia, Pa.	1847
Morton, Thomas George	Philadelphia, Pa.	1864
Moses, S. Gratz	St. Louis, Mo.	1854
Moss, Benjamin Hart	New Orleans, La.	1869
†Mothershead, I. L.	Indianapolis, Ind.	1850
Mott, Alex. B.	U. S. Army.	1864
†Mott, Valentine [d. 1865]	New York, N. Y.	1847
Moulton, Peter	New Rochelle, N. Y.	1853
†Mount, W. [d. 1865]	Cincinnati, Ohio.	1859
†Mowe, Daniel	Lowell, Mass.	1849
Mowry, Robert B.	Allegheny City, Pa.	1850
Mullen, Alexander J.	Madison, Ind.	1850
†Muller, John R. [d. 1868]	Baltimore, Md.	1866
†Munn, Jephtha B. [d. 1863]	Chatham, N. J.	1849
Muncaster, Otho M.	Washington, D. C.	1870
Munson, A. W.	Kenton, Ohio.	1856
Murphy, James	San Francisco, Cal.	1871
Murphy, John A.	Cincinnati, Ohio.	1863
Muscroft, C. S.	Cincinnati, Ohio.	1867
Musgrave, H. B.	Cincinnati, Ohio.	1854
†Mussey, Reuben D. P. [d. 1865]	Cincinnati, Ohio.	1849
Mussey, Wm. Heberden, v. p.	Cincinnati, Ohio.	1858
Mütter, Thos. Dent [d. 1859]	Philadelphia, Pa.	1847
Myers, Wm. H.	Fort Wayne, Ind.	1865

Nagle, Hiester M.	Reading, Pa.	1868
Nally, Chas. Francis	Washington, D. C.	1869
Nance, Hiram	Kewanee, Ill.	1854
Nardyz, M. L.	Cincinnati, Ohio.	1872
Nash, Alfred	Lapeer, Mich.	1872
†Naudain, Arnold	Philadelphia, Pa.	1847
Neal, Harrison	Hollister, Cal.	1871
Neal, Thomas L.	Dayton, Ohio.	1867
Nebinger, Andrew	Philadelphia, Pa.	1858
Neftel, Wm. B.	New York, N. Y.	1870
Neill, Edward H.	San Francisco, Cal.	1871
Nelson, W. H.	Taberg, N. Y.	1872
Neely, S. F.	Leavenworth, Kansas.	1812
†Newell, Selim [d. 1871]	St. Johnsbury, Vt.	1849
†Newman, James M.	Buffalo, N. Y.	1855
Newman, R.	New York, N. Y.	1872
Newman, W. G. H.	Washington, D. C.	1868
Newton, D. N.	Monroeton, Pa.	1872
Nichell, H.	Buffalo, N. Y.	1863
Nichols, C. H.	Washington, D. C.	1858
†Nichols, Whitfield	Newark, N. J.	1849
Nims, Dwight	Jackson City, Mich.	1856
Nixon, Alex. B.	Sacramento, Cal.	1871
Noel, H. R.	Baltimore, Md.	1868
Norcom, W. A. B.	Edenton, N. C.	1872
Norris, Herbert	Philadelphia, Pa.	1872
Norris, James Thomas	Brenham, Texas.	1869
North, Alfred	Waterbury, Conn.	1866
North, Nelson Luther	Williamsburg, N. Y.	1864
†Norton, J. C.	Marion, Ohio.	1850
Norton, O. D.	Cincinnati, Ohio.	1855
†Nott, G. A. [d. 1867]	New Orleans, La.	1852
Nottingham, C. B.	Macon, Ga.	1852
Noyes, Henry D.	New York, N. Y.	1864
Nutt, George D.	Williamsport, Pa.	1872
Oatman, Ira E.	Sacramento, Cal.	1871
Odell, Evander	Unadilla, N. Y.	1870
†Odin, Jr. John	Boston, Mass.	1849
O'Donnel, D. A.	Baltimore, Md.	1853
†Ogden, Benjamin [d. 1867]	New York, N. Y.	1848

†Ogier, Septimus A. [d. 1851]	Frazer, Pa.	1853
O'Hagner, C. J.	Greenville, N. C.	1872
Ohr, G. H.	Cumberland, Md.	1868
†Oliver, Abner McCarty [d. 1869]	Montgomery, Ala.	1869
Ordronaux, John	Roslyn, N. Y.	1864
Osborn, Thos. Childress	Greensboro', Ala.	1869
Osgood, Jonathan W. D.	Greenfield, Mass.	1853
Osler, Owen	Philadelphia, Pa.	1858
O'Sullivan, R. J.	New York, N. Y.	1870
Otis, George A.	U. S. Army.	1868
Owen, Pascal Harrison	Montgomery, Ala.	1869
Owen, W. O.	Lynchburg, Va.	1868
Ozias, H. W.	Philadelphia, Pa.	1872
Packard, John H.	Philadelphia, Pa.	1860
†Padelford, George P. [d. 1861]	Savannah, Ga.	1857
†Page, Calvin G. [d. 1869]	Boston, Mass.	1860
Page, R. H.	Columbus, N. J.	1858
Page, Wm. B.	Philadelphia, Pa.	1872
Paine, Ezra	Montpelier, Vt.	1865
Pallen, Montrose A. s.	St. Louis, Mo.	1858
Palmer, Alonzo Benjamin, v.p.	Ann Arbor, Mich.	1850
†Palmer, George G. [d. 1868]	Stonington, Conn.	1864
Palmer, Gideon S.	Washington, D. C.	1854
Palmer, J. W.	Victor, N. Y.	1864
Palmer, Wm. G.	Washington, D. C.	1866
Pancoast, Joseph	Philadelphia, Pa.	1848
Pancoast, Wm. H.	Philadelphia, Pa.	1868
Paoli, Gerhardt C.	Chicago, Ill.	1863
Pardee, M. B.	So. Norwalk, Conn.	1872
†Parker, Samuel [d. 1870]	Lancaster, Pa.	1854
†Parkman, George	Boston, Mass.	1849
†Parkman, Samuel	Boston, Mass.	1847
Parramore, Edw. L.	Woodland, Cal.	1871
†Parrish, Isaac [d. 1852]	Philadelphia, Pa.	1847
Parrish, Joseph	Media, Pa.	1847
Parrish, W. H.	Philadelphia, Pa.	1872
Parry, J. S.	Philadelphia, Pa.	1872
Parsons, J.	Kingsbridge, N. Y.	1872
Parsons, John W.	Portsmouth, N. H.	1870

Parvin, Theophilus	Indianapolis, Ind.	1867
Patch, Franklin Fletcher	Boston, Mass.	1865
†Patterson, Geo. W. [d. 1852]	Philadelphia, Pa.	1848
†Patterson, Henry S. [d. 1854]	Philadelphia, Pa.	1847
†Pattison, Granville S.	New York, N. Y.	1847
Payton, Daniel	Salem, Oregon.	1871
Peabody, James H.	Omaha, Neb.	1870
Pease, Leavitt Thaxter	Williamsburg, Ohio.	1867
Pease, Rogen W.	Syracuse, N. Y.	1872
Peaslee, Edmund R.	New York, N. Y.	1849
Peck, W. F.	Davenport, Iowa.	1865
Peckham, Fenner H.	Providence, R. I.	1853
Peebles, J. H. M.	New Castle, Pa.	1872
†Peebles, J. F. [d. 1858]	Petersburg, Va.	1847
†Peirson, A. L.	Salem, Mass.	1847
Pennington, Joel	Milton, Ind.	1850
†Pennypacker, Isaac A.	Philadelphia, Pa.	1855
Pepper, Wm.	Philadelphia, Pa.	1872
†Pepper, William [d. 1864]	Philadelphia, Pa.	1847
Percy, Samuel R.	New York, N. Y.	1864
Perkins, Chauncey F.	Erie, Pa.	1867
†Perkins, John D. [d. 1860]	Smyrna, Del.	1848
†Perkins, John P.	Great Barrington, Mass.	1856
Perry, J. G.	New York, N. Y.	1872
†Perry, Marshall S.	Boston, Mass.	1849
Peter Armistead	Georgetown, D. C.	1870
Peters, John C.	New York, N. Y.	1868
†Peticolas, A. E. [d. 1868]	Richmond, Va.	1852
Pettit, Alonzo	Elizabeth, N. J.	1872
Philips, W. H.	Kenton, Ohio.	1856
†Pierce, George A. [d. 1862]	Providence, R. I.	1858
†Pierson, William S.	Windsor, Conn.	1849
†Pike, Nathan S.	Sterling Hill, Conn.	1853
†Pillsbury, John D.	Lowell, Mass.	1849
Pinckney, Ninian (U. S. N.)	Easton, Md.	1843
Pineo, Peter	Hyannis, Mass.	1872
Pinkerton, Thos. H.	Oakland, Cal.	1871
†Pitcher, Zina, P. [d. 1872]	Detroit, Mich.	1850
†Pitkin, A. S.	Burlington, Vt.	1849
Pitner, Thos. J.	Jacksonville, Md.	1872
Pittman, Newson J.	Tarboro, N. C.	1849

Platt, Gideon L.	Waterbury, Conn.	1848
Pollak, S.	St. Louis, Mo.	1852
Pollard, George Fitz Edward	Montgomery, Ala.	1869
Pollock, Alex. McCandless, V.P.	Pittsburg, Pa.	1850
Pollock, Samuel	Williamsport, Pa.	1866
Pomeroy, Oscar D.	New York, N. Y.	1870
†Pond, Benjamin	Westborough, Mass.	1849
Pond, James O.	New York, N. Y.	1847
†Pope, Charles A. V. P.; P. [d. 1870]	St. Louis, Mo.	1851
†Porcher, Francis Y. [d. 1862]	Charleston, S. C.	1851
†Porter, E. M.	Bridgeton, N. J.	1852
Porter, Frank G.	St. Louis, Mo.	1870
Porter, G. Ellis	Lonacoming, Md.	1868
Porter, G. L.	Bridgeport, Conn.	1872
Porter, Henry N.	New York Mills, N. Y.	1864
Porter, H. R.	Washington, D. C.	1872
Porter, Isaac G.	New London, Conn.	1860
†Porter, John B.	U. S. Army	1856
Porter, J. M.	Frostburg, Ind.	1872
†Porter, Mortimer G. [d. 1863]	New York, N. Y.	1860
†Porter, R. M.	Nashville, Tenn.	1857
Porter, Robert R.	Wilmington, Del.	1847
Porter, Jr. W. G.	Philadelphia, Pa.	1872
Post, Alfred C. V. P.	New York, N. Y.	1848
Potter, Fred. Ensign (U.S.N)	Suncook, N. H.	1869
†Potter, J. F. [d. 1868]	Cincinnati, Ohio.	1855
Potter, Milton G.	Buffalo, N. Y.	1872
Powell, Samuel F.	Baltimore, Md.	1866
Powell, Thomas S.	Atlanta, Ga.	1857
†Power, William	Baltimore, Md.	1847
Poynor, J. Smith	Tennessee.	1870
†Pratt, Calvin B.	Bridgewater, Mass.	1860
Pratt, Jefferson	Hopkinton, Mass.	1856
Precht, Carl	San Francisco, Cal.	1871
Prentiss, D. Webster	Washington, D. C.	1868
Price, Jacob	West Chester, Pa.	1864
Pride, J. C.	Pride's Station, Ala.	1872
Priestley, Joseph	Northumberland, Pa.	1872
Prince, David, V. P.	Jacksonville, Ill.	1854
Prout, J. S.	Brooklyn, N. Y.	1872

Purdy, Alfred E. M.	New York, N. Y.	1870
†Purdy, Jotham [d. 1858]	Elmira, N. Y.	1853
Purple, S. S.	New York, N. Y.	1853
Querner, L. A.	Cincinnati, Ohio.	1872
Quimby, Isaac N.	Jersey City, N. J.	1872
Radcliff, Samuel J.	Washington, D. C.	1868
Ramsey, J. W.	Clarksburg, W. Va.	1867
Rand, B. Howard	Philadelphia, Pa.	1868
†Randolph, Jacob	Philadelphia, Pa.	1847
Rankin, A. H.	Sandusky, Ohio.	1872
†Ranney, W. R.	Townshend, Vt.	1848
Raphael, Benjamin J.	New York, N. Y.	1860
Rathbone, Joshua H.	Jamestown, N. Y.	1871
Raschig, W.	Cincinnati, Ohio.	1872
Rawson, Edw. J.	New York, N. Y.	1870
Ray, Isaac	Philadelphia, Pa.	1872
Ray, J. T.	Meadville, Pa.	1868
†Ray, L. G. [d. 1864]	Paris, Ky.	1850
Rea, John	New Castle, Ind.	1870
Read, A. N.	Norwalk, Ohio.	1855
†Ream, John [d. 1869]	Hempfield, Pa.	1854
Reamy, Thaddeus A.	Cincinnati, Ohio.	1867
Reed, A. G.	Philadelphia, Pa.	1872
Reed, Thos. B.	Philadelphia, Pa.	1872
†Reese, D. Meredith, V. P.	New York, N. Y.	1847
Reese, Augustus Joren	Selma, Ala.	1859
Reese, Walter Peterson	Selma, Ala.	1857
Reese, William W.	Brooklyn, N. Y.	1864
Reeve, J. T.	Appleton, Wis.	1872
Reeve, John C.	Dayton, Ohio.	1866
Regensberger, Jacob	San Francisco, Cal.	1871
Register, W. G.	Baltimore, Md.	1870
†Reid, Wm. W.	Rochester, N. Y.	1860
†Remington, Isaac [d. 1862]	Philadelphia, Pa.	1847
Renick, Oscar F.	Wellington, Mo.	1870
Reiter, W. C.	Pittsburg, Pa.	1870
Reyburn, Robert	Washington, D. C.	1868
Reyburn, Thomas	St. Louis, Mo.	1848
Reynolds, D. S.	Louisville, Ky.	1872

Rich, Arthur	Baltimore, Md.	1870
Richards, Chas. H.	Georgetown, Del.	1872
†Richards, C. Orrick	Lancaster, Pa.	1853
†Richards, John [d. 1862]	Washington, D. C.	1858
†Richardson, Braton [d. 1864]	Montrose, Pa.	1863
Richardson, Elliott	Philadelphia, Pa.	1872
Richardson, Horace	Boston, Mass.	1872
Richardson, Joseph G.	Philadelphia, Pa.	1867
†Richardson, S. B.	Louisville, Ky.	1858
Richardson, Tobias Gibson	New Orleans, La.	1855
Richardson, W. H. H.	Winona, Minn.	1872
Richardson, W. L.	Montrose, Pa.	1863
Richings, C. H.	Rockford, Ill.	1872
Ridley, R. B.	La Grange, Ga.	1872
Riggs, Benj. Hogan	Selma, Ala.	1869
Righter, Wash.	Columbia, Pa.	1872
†Riley, A. A.	Fulton, Mo.	1854
Riley, John C.	Washington, D. C.	1855
Ritchie, Louis Warfield	Georgetown, D. C.	1866
†Rivers, Henry Wheaton [d. 1868]	Providence, R. I.	1852
†Rives, L. C. [d. 1870]	Cincinnati, Ohio.	1850
Robbins, Henry A.	Washington, D. C.	1870
Robbins, Joseph	Quincy, Ill.	1865
Roberts, A. C.	Port Madison, Iowa.	1871
Roberts, W. E.	Washington, D. C.	1870
†Roberts, George C. M.	Baltimore, Md.	1847
Robertson, C.	McConnelsville, Ohio.	1856
Robertson, F. M.	Charleston, S. C.	1851
Robinson, Luke	Colusa, Cal.	1871
†Robinson, Lucius Gain [d.'58]	Detroit, Mich.	1856
Robinson, Matthew Fullerton	Newville, Pa.	1871
Robison, James D.	Wooster, Ohio.	1850
†Roby, Joseph	Baltimore, Md.	1849
Rochester, Thomas F.	Buffalo, N. Y.	1860
Rockwell, S. W.	South Windsor, Conn.	1870
†Roddey, F. W. [d. 1865]	Richmond, Va.	1852
†Rogers, Benjamin	Hartford, Conn.	1849
Rogers, Henry R.	Dunkirk, N. Y.	1868
†Rogers, James B.	Philadelphia, Pa.	1847
Rogers, Joseph G.	Madison, Ind.	1867

†Rogers, J. Kearney	New York, N. Y.	1849
Rogers, Lewis	Louisville, Ky.	1859
Rogers, Robert E.	Philadelphia, Pa.	1852
Rogers, Stephen	New York, N. Y.	1865
Rogers, T. C.	Willowgrove, Del.	1864
Ronald, G. W.	Louisville, Ky.	1859
Root, Martin	Byfield, Mass.	1855
Rose, Landon C.	Laporte, Ind.	1853
Ross, Francis Armstrong	Mobile, Ala.	1869
Ross, James	Clarion, Pa.	1870
Ross, James F.	Clarion, Pa.	1871
Ross, John D.	Williamsburg, Pa.	1854
Ross, S. M.	Greenville, Pa.	1872
Ross, Wm. Wallace	South Watsonville, Cal.	1871
Rosenthal, J. M.	Fort Wayne, Ind.	1867
†Rowan, B. G.	Fort Wayne, Ind.	1859
†Rublee, Chauncey M. [d. '69]	Montpelier, Vt.	1865
Ruschenberger, W. S. W.	Philadelphia, Pa.	1850
Russell, John W.	Mount Vernon, Ohio.	1860
Rutherford, Wm. W.	Harrisburg, Pa.	1868
Sabin, S. A.	Palmyra, N. Y.	1870
†Sachse, J. G.	Lancaster, Ohio.	1850
Sager, Abner	Ann Arbor, Mich.	1856
Salisbury, Stephen	Brookline, Mass.	1852
†Sams, C. C. [d. 1865]	Hilsborough, Ohio.	1852
†Sanborn, E. K.	Rutland, Vt.	1860
†Sanborn, Nathan	Henniker, N. H.	1850
Sanborn, Thomas	Newport, N. H.	1858
Sanford, Leonard J.	New Haven, Conn.	1855
Sands, Henry B.	New York, N. Y.	1864
Sandt, John	Stockerton, Pa.	1870
†Sargent, Henry	Worcester, Mass.	1855
†Sargent, J. F.	Concord, N. H.	1850
Satterlee, F. L.	New York, N. Y.	1872
Saunders, Augustus L.	Brookfield, N. Y.	1853
Savory, Charles A.	Lowell, Mass.	1848
Sawtelle, H. W.	Washington, D. C.	1872
Sayre, David M.	Newton, N. J.	1860
Sayre, Lewis Albert, V. P.	New York, N. Y.	1848
Scales, T. Sydney	Mobile, Ala.	1872

†Schenck, Ferdinand S. [d.'60]	Camden, N. J.	1847
Schenck, J. V.	Camden, N. J.	1858
Schilling, Ernest	New York, N. Y.	1854
†Schneck, B. F. [d. 1865]	Lebanon, Pa.	1857
†Scholfield, Edwin [d. 1871]	Philadelphia, Pa.	1864
Schultz, S. S.	Danville, Pa.	1868
Scott, A. H.	Dover, Ark.	1870
Scott, G. H.	Owego, N. Y.	1872
Scott, John	San Francisco, Cal.	1871
Scott, Martin P.	Hooversville, Md.	1851
Scribner, Jas. W.	Tarrytown, N. Y.	1871
Seavey, Calvin	Bangor, Me.	1856
Seelye, Samuel Dibble	Montgomery, Ala.	1869
Seguin, Ed.	New York, N. Y.	1872
Seiler, Jeremiah	Harrisburg, Pa.	1870
Seiler, R. H.	Harrisburg, Pa.	1872
†Selden, Henry	Norfolk, Va.	1848
Selden, O. G.	Shanonsville, Ohio.	1870
Sell, Edward H. M.	New York, N. Y.	1867
Semmes, Alexander Jenkins, s.	Savannah, Ga.	1853
Semmes, Alphonso Thomas	Canton, Miss.	1869
Senseman, H.	Tremont, Ohio.	1872
Severance, R. A.	Bellview, Ohio.	1867
Sewall, John G.	New York, N. Y.	1870
†Sexton, H. G. [d. 1865]	Rushville, Ind.	1870
†Seymour, George	Litchfield, Conn.	1858
Shaffner, J. F.	Salem, N. C.	1872
Shannon, B. F.	Schuylkill Haven, Pa.	1872
†Shantz, Samuel E. [d. 1868]	Utica, N. Y.	1865
Shaw, Benjamin S.	Boston, Mass.	1865
Shaw, Thos. W.	Pittsburg, Pa.	1868
Sheller, Adam	Mt. Joy, Pa.	1856
Shepard, Charles	Grand Rapids, Mich.	1856
Shepherd, M.	Payson, Ill.	1850
Sherman, B. F.	Ogdensburg, N. Y.	1872
†Shipman, Azariah B. [d. '68]	Syracuse, N. Y.	1847
Shively, Jos. W.	Kent, Ohio.	1871
Shove, Seth	Katonah, N. Y.	1860
†Shumway, C. W.	Chicago, Ill.	1863
Shurtleff, Geo. A.	Stockton, Cal.	1871
Sickler, John R.	Mantua, N. J.	1855

Silver, Silas B.	Glenville, Md.	1867
†Simonds, Joseph C.	New Orleans, La.	1849
Simmons, Gustavus L.	Sacramento, Cal.	1871
†Simons, Lewis E.	Saxton's River, Vt.	1864
Simons, Manning	Charleston, S. C.	1870
†Simons, T. Y. V. P.	Charleston, S. C.	1857
Simpson, James	Grass Valley, Cal.	1871
Simpson, Josiah (U. S. A.)	Baltimore, Md.	1853
Sims, Ephraim	New York, N. Y.	1872
Sims, P. D.	Chattanooga, Tenn.	1872
Singer, J. E.	Newport, Pa.	1872
Sinkler, Wharton	Philadelphia, Pa.	1872
Siveter, Thomas	Salem, Iowa.	1854
Skene, A. J. C.	Brooklyn, N. Y.	1872
Skelton, John G.	Richmond, Va.	1872
Skillman, Henry Martyn	Lexington, Ky.	1859
†Skilton, Avery J.	Troy, N. Y.	1848
†Skinner, Alden [d. 1863]	Rockville, Conn.	1849
Skinner, E. J.	Somerset, Ohio.	1872
Slocum, Alfred M.	Philadelphia, Pa.	1858
Smaltz, J. Henry	Philadelphia, Pa.	1855
Smith, Albert	New Rochelle, N. Y.	1847
†Smith, Amos C.	Medina C. H., Ohio.	1854
Smith, B. F.	Mt. Upton, N. Y.	1872
Smith, Charles Gill	Chicago, Ill.	1864
†Smith, Dryden [d. 1868]	Biddeford, Me.	1865
Smith, Jr. Francis Gurney, V.P.	Philadelphia, Pa.	1849
Smith, George K.	Brooklyn, N. Y.	1866
Smith, Gouverneur M.	New York, N. Y.	1858
Smith, G. W.	Hollidaysburg, Pa.	1872
Smith, Geo. Wash.	Canton, Miss.	1869
Smith, Heber	New York, N. Y.	1869
Smith, Henry H.	Philadelphia, Pa.	1853
Smith, Howard	New Orleans, La.	1869
Smith, Harvey W.	Mount Vernon, Ohio.	1870
†Smith, James M.	Springfield, Mass.	1850
Smith, Jerome Candee	New York, N. Y.	1864
†Smith, J. B.	Cincinnati, Ohio.	1858
†Smith, Joseph Mather [d. '65]	New York, N. Y.	1847
Smith, Joseph T.	Canandaigua, N. Y.	1860
Smith, Latham A.	New Milford, Pa.	1860

†Smith, Lyndon A., V.P. [d.'65]	Newark, N. J.	1847
†Smith, Moses B. [d. 1855]	Philadelphia, Pa.	1847
Smith, Nathan R.	Baltimore, Md.	1847
†Smith, Orrin [d. 1867]	Chicago, Ill.	1849
Smith, Robert Mark	Athens, Ga.	1869
Smith, Samuel P.	Cumberland, Md.	1849
Smith, S. Hanbury	New York, N. Y.	1850
Smith, S. P.	Prattsville, Ala.	1872
†Smith, Thomas Mackie	Brandywine, Del.	1849
Smith, Wm. F.	San Francisco, Cal.	1871
Smith, Wm. Manlius	Manlius, N. Y.	1870
Smythe, Andrew Woods	New Orleans, La.	1869
†Sneed, William C.	Frankfort, Ky.	1859
Snodgrass, J. H.	Pittsburg, Pa.	1872
†Snow, A. B.	Boston, Mass.	1849
†Snow, Simeon [d. 1865]	Root, N. Y.	1849
Snowden, S. Gustine	Franklin, Pa.	1870
Snowdon, J. W.	Waterford Works, N. C.	1872
Soulé, Artemas G.	San Francisco, Cal.	1871
Southard, Lott	Newark, N. J.	1864
Southworth, Charles T.	Monroe, Mich.	1867
†Spalding, James [d. 1858]	Montpelier, Vt.	1849
Spaulding, Miles	Groton, Mass.	1849
†Spencer, Pitman C. [d. 1860]	Petersburg, Va.	1852
Spear, J. C.	U. S. Navy.	1872
†Spencer, Thomas D. [d. 1857]	Philadelphia, Pa.	1853
Spitler, Adam	Carthage, Ill.	1854
†Spooner, Paul	New Bedford, Mass.	1848
Sprague, Francis P.	Boston, Mass.	1865
Sprague, L. S.	Williamson, N. Y.	1860
Spratt, G. R.	Clymer, N. Y.	1872
Squibb, Edward R.	Brooklyn, N. Y.	1860
Squire, T. H.	Elmira, N. Y.	1868
†Staats, Barent P. [d. 1871]	Albany, N. Y.	1853
Stackpole, P. A.	Dover, N. H.	1849
Stanley, Elwood	Sandusky City, Ohio.	1871
†Stanton, David [d. 1871]	New Brighton, Pa.	1856
Staples, Franklin	Winona, Minn.	1871
Staples, G. M.	Dubuque, Iowa.	1872
Starr, C. S.	Rochester, N. Y.	1872
St. Clair, F. O.	Washington, D. C.	1870

Stearns, Henry P.	Hartford, Conn.	1870
†Stearns, John [d. 1848]	New York, N. Y.	1847
†Stedman, Charles H. [d.1866]	Boston, Mass.	1848
Steele, A. J.	St. Louis, Mo.	1867
†Steele, E. A.	Marshall, Ill.	1863
Steele, Henry K.	Denver, Col.	1850
Stein, Alex. W.	New York, N. Y.	1870
Steiner, Lewis H.	Frederick, Md.	1850
Steinreide, Joseph	Benton, Miss.	1870
†Stephenson, Mark	New York, N. Y.	1850
Stetler, John G.	Philadelphia, Pa.	1870
Stevens, Loman S.	Three Rivers, Mich.	1871
Stevens, Thaddeus M.	Indianapolis, Ind.	1867
Stevenson, J. M.	Baltimore, Md.	1872
Stevenson, J. M.	Greenville, Pa.	1872
†Steward, Joseph D. [d. 1854]	Philadelphia, Pa.	1847
Steward, Scott	Philadelphia, Pa.	1860
Stewart, Philander	Peekskill, N. Y.	1853
Stewart, Wm. D.	Washington, D C.	1870
Stillé, Alfred, S.; P.	Philadelphia, Pa.	1847
†Stillé, Moreton [d. 1855]	Philadelphia, Pa.	1853
Stillman, Sidney	Millerton, N. Y.	1865
Stillson, Joseph	Bedford, Ind.	1867
Stirling, R. H.	Baltimore, Md.	1870
Stockwell, Cyrus M.	Port Huron, Mich.	1856
Stockton, E. A.	Stockton, Cal.	1871
Stone, Alex. J.	St. Paul, Minn.	1872
†Stone, James W.	Boston, Mass.	1850
†Stone, John O. [d. 1868]	New York, N. Y.	1853
†Stone, Joseph [d. 1849]	Hardwick, Mass.	1849
Stone, Robert K.	Washington, D. C.	1852
Stone, Warren, Sr., V. P.	New Orleans, La.	1869
Storer, D. Humphreys, V.P.; P.	Boston, Mass.	1849
Storer, Horatio R., S.; V. P.	Boston, Mass.	1856
Stormont, D. W.	Topeka, Kansas.	1858
Stout, Arthur B.	San Francisco, Cal.	1871
Strawbridge, Geo.	Philadelphia, Pa.	1872
Strawbridge, James D.	Danville, Pa.	1860
Strickland, D. H.	Fairview, Pa.	1870
Strickland, R.	Enfield, Conn.	1872
Strong, Thomas D.	Westfield, N. Y.	1871

Strothotte, A.	St. Louis, Mo.	1870
Stuart, A. B.	Winona, Minn.	1870
†Studdiford, J. Henry [d. '70]	Lambertville, N. J.	1866
Studdiford, Theo. H.	Lambertville, N. J.	1870
Sullivan, Geo. R.	Flemington, N. J.	1872
Sullivan, John L.	Malden, Mass.	1865
†Sumner, George	Hartford, Conn.	1847
Sutton, George	Aurora, Ind.	1856
Sutton, Robert S.	Allegheny, Pa.	1871
Swan, S. M.	Johnstown, Pa.	1872
Swartz, Joseph	Duncannon, Pa.	1866
†Swayne, Caleb [d. 1860]	London Grove, Pa.	1859
†Swett, John A.	New York, N. Y.	1847
Swett, John L.	Newport, N. H.	1864
†Taft, Marcus L. [d. 1850]	New York, N. Y.	1849
†Taliaferro, W. I. [d. 1871]	Cincinnati, Ohio.	1850
Talley, A. N.	Columbia, S. C.	1858
Tanneyhill, G. Lane	Baltimore, Md.	1866
Taylor, Charles F.	New York, N. Y.	1866
Taylor, H. Genet	Camden, N. J.	1870
Taylor, Isaac E.	New York, N. Y.	1853
Taylor, Morse K.	Huntsville, Ala.	1863
†Taylor, Othniel H. [d. 1869]	Camden, N. J.	1847
†Taylor, William [d. 1865]	Manlius, N. Y.	1853
Taylor, Wm. E.	U. S. Navy.	1871
Taylor, Wm. H.	Cincinnati, Ohio.	1867
Taylor, Wm. Terry	Philadelphia, Pa.	1869
†Teackle, John N.	Baltimore, Md.	1848
Tefft, Lake Innocent	Syracuse, N. Y.	1847
Tellkampt, Theodore A.	New York, N. Y.	1855
†Tenbroeck, S. B.	Paris, Ill.	1867
Tenebrey, G. W.	Paterson, N. J.	1872
Thayer, A. H.	Grafton, West Va.	1870
Thayer, William Henry	Brooklyn, N. Y.	1860
†Theobald, Elisha W.	Baltimore, Md.	1848
Thomas, C. F.	Covington, Ky.	1872
†Thomas, Geo. W. [d. 1848]	Norristown, Pa.	1847
†Thomas, John M. [d. 1853]	Georgetown, D. C.	1848
†Thomas, Richard H.	Baltimore, Md.	1848
†Thomas, Robert P. [d. 1864]	Philadelphia, Pa.	1855

Thomason, T. J.	Perrineville, N. J.	1860
Thompson, A. G.	Islip, N. Y.	1872
Thompson, Bradford S.	New York, N. Y.	1870
†Thompson, James	Northampton, Mass.	1856
Thompson, J. Ford	Washington, D. C.	1866
Thompson, J. Harry	Washington, D. C.	1868
†Thompson, Robert [d. 1865]	Columbus, Ohio.	1850
†Thompson, Rezin [d. 1871]	Nashville, Tenn.	1869
†Thompson, Samuel [d. 1872]	Albion, Ill.	1850
Thompson, S. W.	Evansville, Ind.	1872
Thoms, Wm. Faulds	New York, N. Y.	1867
Thomson, George N.	Boston, Mass.	1865
†Thomson, Horatio	Belchertown, Mass.	1860
Thomson, Wm.	U. S. Army,	1867
Thorndike, Albert	Stockton, Cal.	1871
Thorne, Walter Scott	San Jose, Cal.	1871
Thorne, Wm.	Hastings, Minn.	1870
Thornton, S. C.	Moorestown, N. J.	1872
Thrall, Seneca B.	Ottumwa, Iowa.	1871
Thruston, John	Louisville, Ky.	1872
†Thweatt, J. J. [d. 1868]	Petersburg, Va.	1852
Titcomb, B.	Baltimore, Md.	1868
Titus, Isaac Sutven	Stockton, Cal.	1871
Tobie, E.	Buffalo, N. Y.	1863
Todd, A. S.	Wheeling, W. Va.	1870
Todd, Francis W.	Stockton, Cal.	1871
Todd, Joseph Henry	Shreve, Ohio.	1869
Todd, J. S.	West Point, Ga.	1872
Todd, L. Beecher	Lexington, Ky.	1859
Todd, L. L.	Paris, Ill.	1872
Todd, O. D.	Eminence, Ky.	1872
Todd, R. N.	Indianapolis, Ind.	1867
Todd, Seth J.	Washington, D. C.	1855
Toner, Joseph Meredith	Washington, D. C.	1864
Topping, G. W.	DeWitt, Mich.	1872
Townsend, E. P.	Beverly, N. J.	1872
Townsend, G. J.	Eliot, Mass.	1870
†Townsend, Howard [d. '67]	Albany, N. Y.	1858
Townsend, J. H.	Edgarton, Ohio.	1867
Townsend, R. H.	Philadelphia, Pa.	1848
Townsend, Ralph M.	Philadelphia, Pa.	1872

Townsend, T. Beers	New Haven, Conn.	1864
Townsend, W. W.	Chatham, Pa.	1855
Townshend, S.	Washington, D. C.	1872
Traver, Wm. H.	Providence, R. I.	1865
Treichler, J. F.	McKeansburg, Pa.	1872
Treichler, S. K.	Jonestown, Pa.	1858
Trenor, Eustace	Alameda, Cal.	1871
†Trenor, Jr., Jno. [d. '67]	New York, N. Y.	1852
†Trigg, Daniel	Abingdon, Va.	1847
†Tripler, Chas. S., V. P. [d. '66]	United States Army.	1850
Trist, H. B.	Washington, D. C.	1866
Troth, Samuel N.	Philadelphia, Pa.	1863
Tuck, Henry	Boston, Mass.	1870
Tucker, George G.	Westfield, Mass.	1853
Tucker, J. C.	San Francisco, Cal.	1870
Turnbull, Laurence	Philadelphia, Pa.	1852
Turner, Sylvester W.	Chester, Conn.	1860
†Tweed, T. M.	Eckmansville, Ohio.	1850
†Twitchell, Amos	Keene, N. H.	1849
Tyler, Grafton, V. P.	Georgetown, D. C.	1848
†Tyler, Samuel [d. '56]	Frederick, Md.	1847
Tyrrell, Gerhard G.	Sacramento, Cal.	1871
Tyson, James	Philadelphia, Pa.	1872
†Uhler, John [d. 1856]	Philadelphia, Pa.	1847
Uhler, John R.	Baltimore, Md.	1866
Ulrich, D. A.	Reading, Pa.	1872
Underhill, Alfred	New York, N. Y.	1860
†Upshur, George L.	Norfolk, Va.	1848
Vallandigham, I. S.	St. George's, Del.	1872
Van Buren, Peter	New York, N. Y.	1852
Van Bibber, W. Chew	Baltimore, Md.	1865
Vanderpool, S. Oakley	New York, N. Y.	1853
Vandervoort, John L.	New York, N. Y.	1864
Van Deusen, Harmon	Mineral Point, Wis.	1853
Van Patten, Chas. Hansen	San Jose, Cal.	1871
Vanvoorhis, J. S.	Bellevernon, Pa.	1872
Varian, Wm.	Titusville, Pa.	1872
Varick, Theodore R.	Jersey City, N. J.	1853
Vaughan, B. A.	Columbus, Miss.	1872

Velder, Louis	Elmira, N. Y.	1870
Vosburgh, D. M.	Earlville, Ill.	1872
†Wade, T. A.	Brooklyn, N. Y.	1855
Wales, Philips S.	U. S. Navy.	1870
†Walker, Isaac R.	Spread Eagle, Pa.	1848
Walker, J.	Brooklyn, N. Y.	1872
Walker, Joseph P.	Cincinnati, Ohio.	1855
Walker, M. M.	Richmond, Va.	1872
Wallace, Edward	Philadelphia, Pa.	1855
Wallace, W. M.	Erie, Pa.	1870
Walsh, D. M.	Baltimore, Md.	1872
Walsh, John Kearney	Washington, D. C.	1869
Walsh, Joseph	Washington, D. C.	1870
Walsh, Ralph L. S.	Washington, D. C.	1870
Walsh, W. M.	Savannah, Ga.	1870
Walton, M. W.	Ridott, Ill.	1872
Ward, J. Robert	Baltimore, Md.	1870
Wardner, Horace	Cairo, Ill.	1869
†Ware, John	Boston, Mass.	1848
Warner, Everardus B.	New York, N. Y.	1855
†Warner, Richard	Cromwell, Conn.	1848
Warren, Edward	Baltimore, Md.	1849
Warren, George A.	Hopkinton, Miss.	1860
†Warren, John C., V. P.; P. [d. 1856]	Boston, Mass.	1848
Warren, J. Collins	Boston, Mass.	1870
†Warren, J. E.	Cumberland, R. I.	1856
Warren, Joseph H.	Boston, Mass.	1865
†Warren, J. Mason [d. 1867]	Boston, Mass.	1849
Warriner, W. C.	Salem, Oregon.	1871
†Washburn, Cyrus [d. 1860]	Vernon, Vt.	1849
Waterman, Luther D.	Indianapolis, Ind.	1870
Watkins, Claibourne	Little Rock, Ark.	1869
†Watson, A. A. [d. 1868]	Boston, Mass.	1849
Watson, B. A.	Jersey City, N. J.	1872
†Watson, John	New York, N. Y.	1847
†Watson, John M.	Nashville, Tenn.	1857
†Watts, Robert [d. 1867]	New York, N. Y.	1847
Wayland, Jas. F.	Chico, Cal.	1871
Wayson, George W.	Baltimore, Md.	1848

Weatherly, Job Sobieski, V. P.	Montgomery, Ala.	1868
†Webb, Reynold	Madison, Conn.	1849
Webb, W. W.	Wellsboro', Pa.	1872
Weeds, Jas. F.	Nashville, Tenn.	1872
Weeks, S. H.	Portland, Me.	1872
Weidman, W. Murray	Reading, Pa.	1868
Weirich, Israel	Martin's Ferry, Ohio.	1870
Weisse, F. D.	New York, N. Y.	1872
†Welburn, John C. [d. 1857]	Frankford, Mo.	1854
†Welch, Archibald	Hartford, Conn.	1848
Welch, Benjamin	Lakeville, Conn.	1850
Welch, Samuel Mullins	Galveston, Texas.	1869
Welch, Wm. M.	Philadelphia, Pa.	1872
Welsh, W. S.	Franklin, Pa.	1872
†Wellford, Beverly R., V. P.; P. [d. 1870]	Richmond, Va.	1847
Wellford, J. Spottswood	Fredericksburg, Va.	1852
†Wellington, Timothy	West Cambridge, Mass.	1850
Wells, G. W.	New York, N. Y.	1872
Wells, Wm. Lehman	Philadelphia, Pa.	1866
†West, Calvin, V. P.	Hagerstown, Ind.	1857
West, Geo. W.	Richmond, Va.	1870
West, Henry	St. Clairsville, Ohio.	1850
West, M. Calvin	Rome, N. Y.	1864
†West, Francis, S. [d. 1868]	Philadelphia, Pa.	1847
West, S. B.	Martins Ferry, Ohio.	1870
†West, Silas [d. 1859]	Binghamton, N. Y.	1856
Westmoreland, W. F.	Atlanta, Ga.	1872
Wey, William C.	Elmira, N. Y.	1864
†Wheatland, Richard H.	Salem, Mass.	1858
Wheeler, J. H.	Dover, N. Y.	1872
Whitbeck, John F.	Rochester, N. Y.	1864
White, George A.	Sacramento, Cal.	1871
White, John Buell	Saginaw, Mich.	1856
White, J. H.	Dover, N. H.	1872
White, J. Orlando	Camden, N. J.	1872
White, James P.	Buffalo, N. Y.	1849
White, J. S.	Memphis, Tenn.	1859
†White, S. N. C.	Pooleville, Md.	1858
†White, Vassal	Curtisville P. O., Mass.	1853
White, William T.	New York, N. Y.	1866

White, Whitman V.	New York, N. Y.	1870
Whitehead, Wm. M.	Elizabeth, N. J.	1870
Whitehead, Wm. R.	New York, N. Y.	1868
†Whitridge, Wm. C. [d. 1857]	New Bedford, Tenn.	1853
Whitney, James D.	San Francisco, Cal.	1871
Whitney, James P.	San Francisco, Cal.	1871
†Whitney, Simon	Framingham, Mass.	1842
Whittaker, J. B.	Fall River, Mass.	1872
Whitten, H.	Troy, N. Y.	1872
Whittlesey, H. N.	Durham, N. Y.	1872
Wickersham, Swayne	Chicago, Ill.	1858
Wiesel, H. J.	Wheeling, W. Va.	1870
†Wilcox, Charles H.	Buffalo, N. Y.	1853
Wilcox, Lucian Sumner	Hartford, Conn.	1860
†Wilder, Charles W.	Leominster, Mass.	1850
†Wiley, Adams	Roxbury, Mass.	1853
Wiley, Penrose	Leesport, Pa.	1828
†Willard, Augustus [d. 1868]	Green N. Y.	1847
†Willard, Henry	Boston, Mass.	1855
†Willard, Sylvester D. [d.'65]	Albany, N. Y.	1860
Williams, A. S.	Fostoria, Ohio.	1867
†Williams, Isaac C. [d. 1868]	Bloomington, Ohio.	1855
Williams, Lewis	Pomfret, Conn.	1855
Williams, Louis	Marion, Ind.	1867
Williams, P. C.	Baltimore, Md.	1867
†Williams, Stephen W.	Deerfield, Mass.	1847
Williams, William H.	Brooklyn, N. Y.	1860
†Willis, Isaac P.	Royalston, Mass.	1860
Willis, John W.	Waltham, Mass.	1868
Wilson, Henry M.	Baltimore, Md.	1866
Wilson, Ellwood	Philadelphia, Pa.	1855
†Wilson, James F. [d. 1868]	Wilmington, Del.	1849
Wilson, John C.	Philadelphia, Pa.	1872
†Wilson, Myron W.	Hartford, Conn.	1855
Willard, E. R.	Wilmington, Del.	1872
Williams, John T.	Philadelphia, Pa.	1872
Williams, W. H.	Denver, Col.	1872
Williamson, Jefferson	Ottumwa, Iowa.	1871
†Wiltbank, John [d. 1860]	Philadelphia, Pa.	1847
†Wing, Joel A. [d. 1852]	Albany, N. Y.	1847
Winston, Gustavus S.	New York, N. Y.	1865

†Winton, Nelson [d. 1864]	Havana, N. Y.	1853
Wise, T. N.	Covington, Ky.	1867
Wister, Caspar, T.	Philadelphia, Pa.	1852
Withers, Thomas	Petersburg, Va.	1860
†Witherwax, John M. [d.'69]	Davenport, Iowa.	1850
Witmer, A. H.	Philadelphia, Pa.	1872
Winslow, John	New York, N. Y.	1872
†Witter, William	Willimantic, Conn.	1849
Wittig, Chas. F.	Philadelphia, Pa.	1866
Wittman, Carl,	Brooklyn, N. Y.	1865
Wolcott, Samuel G.	Utica, N. Y.	1866
Womble, Pembroke M.	Baltimore, Md.	1858
Wood, Charles S.	New York, N. Y.	1867
Wood, E. A.	Pittsburg, Pa.	1870
Wood, George B., P.	Philadelphia, Pa.	1847
Wood, Jr., H. C.	Philadelphia, Pa.	1872
†Wood, Isaac, T. [d. 1868]	New York, N. Y.	1849
Wood, James R.	New York, N. Y.	1847
Wood, Marcus M.	Greene, N. Y.	1870
†Wood, R. C.	United States Army.	1858
Wood, Thomas	Muncy, Pa.	1847
Wood, Thomas	Cincinnati, Ohio.	1855
Wood, W. Maxwell, U. S. N.	Owingo Mills, Md.	1848
Woodbridge, John Elliott	Youngstown, Ohio.	1869
†Woodbury, Peter P.	Bedford, N. H.	1848
Woodhull, Addison W.	Newark, N. J.	1860
Woodruff, William	Thomaston, Conn.	1856
Woods, J. K.	Mendon, Ohio.	1872
Woodward, Adrian T.	Brandon, Vt.	1853
Woodward, Ashbel	Franklin, Conn.	1849
Woodward, Charles	Cincinnati, Ohio.	1850
Woodward, Joseph Janvier, U. S. A.	Washington, D. C.	1865
Woodworth, Benjamin Studley	Fort Wayne, Ind.	1856
Woolen, G. V.	Indianapolis, Ind.	1867
Woolley, J. V. S.	New York, N. Y.	1872
Worster, Joseph	New York, N. Y.	1849
Worthington, Joshua H.	Philadelphia, Pa.	1872
Worthington, L. S.	Cincinnati, Ohio.	1872
Worthington, Wilmer	West Chester, Pa.	1848
Wright, Eliphalet	Lee, Mass.	1870

Wright, Daniel Fleming	Clarksville, Tenn.	1859
Wright, John	Clinton, Ill.	1867
Wyckoff, C. C.	Buffalo, N. Y.	1863
Wyeth, W. T.	San Jose, Cal.	1872
Wylie, A. N.	Ripley, Ohio.	1867
Wylie, A. P.	Chester, S. C.	1870
Yandell, D. W., V. P.; P.	Louisville, Ky.	1850
Yandell, L. P.	Louisville, Ky.	1848
Yandell, Jr., Lumsford Pitt	Louisville, Ky.	1869
†Yardley, Thomas H. [d. 1860]	Philadelphia, Pa.	1847
Yeager, Theodore C.	Allentown, Pa.	1865
†Yearby, George T. [d. 1865]	Eastville, Va.	1852
Young, Noble, V. P.	Washington, D. C.	1848
Zeigler, George J.	Philadelphia, Pa.	1853
Zeigler, J. L.	Mount Joy, Pa.	1852
Zitzer, John Jacob	Carlisle, Pa.	1869

INDEX.

Address of President D. W. Yandell, 85
Advances in operations for cataract, 511
Allen, Dr. Harrison, on soft palate, etc., 537
Arkansas, climatology, etc., of, 397
Armstrong, Dr. J., notice of, 594

Baker, Dr. D. notice of, 594
Bandage, starch, 563
Blood corpuscle, structure of white, 161
Bordley, Dr. Jas., notice of, 588
Bradford, Dr. J. T., notice of, 585
Brenneman, Dr. E. D. W., notice of, 581
Buck, Dr. W. D., notice of, 593
Buckley, Dr. H. D., notice of, 594
Bush, Dr. L. P., climatology, etc., of Delaware, 371
By-laws, 669

Calculi, vesical, 521
California, climatology, etc., of, 335
Cancer treated by electrolysis, 525
Catalogue of library, 108
Cataract, Dr. H. Knapp on operations for, 511
Clarkson, Dr. C. C., notice of, 594
Climatology of Arkansas, 397
of California, 335
of Delaware, 371
of Pennsylvania, 437
of South Carolina, 275
of New Jersey, 475
of West Virginia, 245
Clinical thermometry, 145
Code of ethics, 677
Committee on medical education, report of, 117
literature, report of, 125
of publication, report of, 77
Constitution, 661
Cutter, Dr. E., on production of vaccine virus, 199

Dayton, Dr. A. B., notice of, 594
Delaware, climatology, etc., of, 371
De Witt, Dr. M. F., notice of, 588
Dudley, Dr. E., notice of, 594
Dunbar, Dr. J. R. W., notice of, 588

Education, medical, report on, 117
Electrolysis, cancer treated by, 525

Epidemics of Arkansas, 397
of California, 335
of Delaware, 371
of Pennsylvania, 437
of South Carolina, 275
of West Virginia, 245
Essay, Prize, 607
Ethics, code of, 677

Femur, removal of portion of, 531
Fractures, starch bandage for, 563

Gibson, Dr. G. S., notice of, 590
Greene, Dr. J. M., notice of, 603

Hall, Dr. D. D., notice of, 584
Hamill, Dr. G. A., notice of, 597
Hartshorne, Dr. H., on vaso-motor physiology, 183
Hatch, Dr. F. W., climatology, etc., of California, 335
Haxall, Dr. R. W., notice of, 599
Hellen, Dr. B. J., notice of, 575
Hewitt, Dr. C. N., on starch bandage, 563
Hildreth, Dr. E. A., climatology, etc., of West Virginia, 245
Hill, Dr. T. R., notice of, 572
Hip-joint disease, removal of portion of femur for, 531
Holbrook, Dr. J. E., notice of, 595
Hunt, Dr. E. M., meteorology of New Jersey, 475

Jackson, Dr. J. D., report on necrology, 573
Johnson, Dr. N., notice of, 584

Kierland, Dr. P. E., notice of, 593
Knapp, Dr. H., operations for cataract, 511

Lawrence, Dr. G. W., climatology, etc., of Arkansas, 397
Librarian, report of, 107
Library, catalogue of, 108
Lilly, Dr. H. M., notice of, 597
Literature, medical, report on, 125

McClery, Dr. J. F., Jr., notice of, 581
Magruder, Dr. W. B., notice of, 577
Maury, Dr. T. F., notice of, 582

Medical education, report on, 117
literature, report on, 125
necrology, report on, 573
Members, permanent, 703
Merritt, Dr. John, notice of, 575
Meteorology of New Jersey, 475
Minutes of twenty-third session, 9
address of Dr. Rogers, 9
of Dr. Hartshorne, 11
list of delegates, 13
resolution of Dr. Askew, 33
committee on ethics, 35
on nominations, 35
members by invitation, 36, 39
resolution of Dr. Bronson, 36
report of committee of publication, 37
of treasurer, 37
on medical education, 37
of librarian, 37
on prize essays, 37
on medical literature, 37
necrology, 37
resolution of Dr. Pollock, 38
resolutions on publication, 39
communication from Philadelphia College of Physicians, 40
Dr. Stein on diseases of animals, 40
resolution on alcohol, 41
report on nomenclature, 41
resolution of Dr. Keller, 44
officers for 1873, 44
resolutions of Dr. S. G. Moses, 45
report on national health council, 46
committees for 1873, 51
officers of sections for 1873, 52
report of committee on ethics, 53
resolutions on Dr. Pitcher, 60
amendment to constitution, 60
special committees for 1873, 60
committee on climatology for 1873, 61
"contract physicians," 62
"yellow fever," by Dr. Jones, 62
minutes of section on materia medica and chemistry, 62
resolution on Dr. Gerhard, 62
report on cinchona-tree, 63
reports of special committees, 65
amendment to by-laws, 66
resolution of Dr. Howard on sections, 66
resolutions of Dr. Hartshorne on "experts," 67
on Dr. Jackson, 67
resolution of Dr. La Roche, 69
on renewal of prescriptions, 69
"thanks," 69
resolution of Dr. Hartshorne on Drs. Jackson and Dickson, 69
salary of secretary, 70
committee on same, 70
"thanks," 70
"Horace Wells," 71
resolution of Dr. Bolles, 71
Minutes of twenty-third session—
minutes of section on surgery and anatomy, 71
"P. De Marmon," 71
relations between physicians and druggists, 79
"medal," 72
"thanks," 72
delegates abroad, 72
resolutions on women physicians, 72
"thanks," 72
resolution of Dr. Quimby, 73
"thanks," 73
Minutes of section on materia medica and chemistry, 193
on medical jurisprudence, hygiene, and physiology, 157
topography and epidemics, 239
on practice of medicine and obstetrics, 141
Mussey, Dr. W. H., case of vesical calculi with polypi of the prostate, 521
treatment of cancer by electrolysis, 525

Necrology, report on, 573
New Jersey, meteorology of, 475

Officers, 695
Operations for cataract, 511
Ordinances, 674

Palate, soft, in health and disease, 587
Pancoast, Dr. G. L., notice of, 578
Partial report on production of vaccine virus, 199
Pawling, Dr. W., notice of, 587
Peck, Dr. W. F., removal of portion of femur, 531
Pennsylvania, climatology, etc., of, 437
Percy, Dr. S. R., on phosphorus, 607
Permanent members, 703
Philadelphia, smallpox in, 437
Phosphorus as an organismal element, 607
Physiology, vaso-motor, 183
Pitcher, Dr. Zina, notice of, 591
Polypi of prostate gland, 521
President's address, 85
Principles in treatment of fractures with starch bandage, 563
Prize essay, 607
Production of vaccine virus, 199
Prostate gland, polypi of, 521
Publication, committee of, report of, 77

Report of committee of publication, 77
of librarian, 107
on American medical necrology, 573
on medical education, 117
literature, 125
of treasurer, 79

Rice, Dr. D. W. C., notice of, 574
Richardson, Dr. J. G., on structure of white blood corpuscle, 161
Roberts, Dr. J. M., notice of, 576
Robinson, Dr. A. C., notice of, 589
Rowell, Dr. I., notice of, 574

Section on materia medica and chemistry, 198
on medical jurisprudence, hygiene, and physiology, 157
topography and epidemics, 289
on practice of medicine and obstetrics, 141
on surgery and anatomy, 479
Seguin, Dr. E., on clinical thermometry, 145
Simons, Dr. M., climatology, etc., of South Carolina, 275
Smallpox in Philadelphia, 487
Smith, Dr. E. H., notice of, 592
South Carolina, climatology, etc., of, 275
Starch bandage, 568
Studdiford, Dr. J. H., notice of, 593
Structure of white blood corpuscle, 161
Surgery and anatomy, section on, 479

Thermometry, clinical, 145
Treasurer, report of, 79
Tucker, Dr. D. H., notice of, 601.

Vaccine virus, 199
Vaso-motor physiology, 183
Vesical calculi, 521

Warren, Dr. J., notice of, 594
Wells, Dr. W. L., climatology, etc., of Pennsylvania, 437
West Virginia, climatology, etc., of, 245
White blood corpuscle, structure of, 161

Yandell, Dr., address of, 85

APPENDIX.

NOMENCLATURE OF DISEASES.

GENERAL PATHOLOGY.

1. Irritation. Irritatio.
   A morbid increase of action in a part, short of inflammation.

2. Inflammation. Inflammatio.
   A morbid increase of action in a part, with altered nutrition, generally accompanied with increased heat, redness, pain, and swelling.

3. Suppuration. Suppuratio.
   A state of inflammation characterized by the production of pus.

4. Ulceration. Ulceratio.
   A state of inflammation in which there is loss of substance on a free surface.

5. Abscess. Abscessus.
   A cavity containing pus.

6. Depression. Depressio.
   A morbid diminution of action.

7. Debility. Debilitas. *Syn.* Asthenia.
   Morbid deficiency of power.

8. Degeneration. Degeneratio.
   Degradation of structure.

9. Mortification. Mortificatio.
   The dying of a part.

10. Gangrene. Gangræna.
    The death of a part.

11. Atrophy. Atrophia.
    Morbid diminution of structure.

12. Hypertrophy. Hypertrophia.
    Morbid increase of structure.

13. Congestion. Congestio. *Syn.* Hyperæmia.
Morbid accumulation of blood in a part.

a. Active congestion. Congestio activa.
Congestion with increased activity of the circulation.

b. Passive congestion. Congestio passiva.
Congestion from impediment of the circulation.

14. Hemorrhage. Hæmorrhagia.
Abnormal loss of blood.

15. Dropsy. Hydrops.
Morbid effusion of serous fluid into the areolar tissue or serous cavities.

16. Fever. Febris.
An acute affection of the system, with increased heat and derangement of all the functions.

17. Cachexia. Cachexia.
Chronic disease, in which, with various disturbances of the functions, there is a special morbid state of the blood.

18. Tuberculosis. Tuberculosis.
A morbid state of the system in which there is a disposition to the formation of tubercle.

19. Scrofulosis. Scrofulosis.
A morbid state of the system in which there is a disposition to a peculiar low, chronic, and obstinate inflammation, with or without the formation of tubercle, or matter resembling it.

20. Rickets. Rachitis.
A constitutional disease of early childhood, manifested by curvature of the shafts of the long bones, and enlargement of their cancellous extremities.

21. Cretinism. Cretismus.
A condition of imperfect development and deformity of the whole body, especially of the head, occurring in the valleys of certain mountainous districts, and attended by feebleness or absence of the mental faculties and special senses, and often associated with gôitre.

22. Melanosis. Melanosis.
A morbid state of system, in which there is a disposition to the deposit of a peculiar black matter.

23. Carcinoma. Carcinoma.
A morbid state of system in which there is a disposition to a certain malignant growth, denominated carcinoma.

24. Zymosis. Zymosis.
A morbid state of system, in which there is supposed to be a fermentative process going on in the blood, or which is believed to result from the action on the system of substances undergoing a species of fermentation.

25. Parasitic disease. Morbus parasiticus.
Disease arising from the presence in the system of parasites of vegetable or animal origin.

GENERAL DISEASES.
MORBI CORPORIS UNIVERSI.

26. Intermittent fever. Febris intermittens. *Syn.* Fever and ague.

27. Pernicious intermittent fever. Febris intermittens perniciosa.
A malignant form of intermittent fever.

28. Remittent fever. Febris remittens.
A malarial fever of indefinite duration, characterized by regularly returning exacerbations.

29. Pernicious remittent fever. Febris remittens perniciosa.
A malignant form of remittent fever.

30. Yellow fever. Febris flava.
An epidemic continued fever, characterized by yellowness of the skin, and accompanied in severe cases by hemorrhage from the stomach (usually in the form of black vomit) and from other parts.

31. Febricula. Febricula.
Simple fever of not more than three or four days' duration.

32. Simple continued fever. Febris continua simplex.
Continued fever having no specific character, of more than four days' duration.

33. Relapsing fever. Febris recidiva.
A continued fever, characterized by an abrupt relapse, after an intermission of about a week.

34. Enteric fever. Febris enterica. *Syn.* Typhoid fever; Enteric typhus; Abdominal typhus.
A continued fever, characterized by the presence of rose-colored spots, chiefly on the abdomen, and a tendency to diarrhœa, with specific lesions of the small intestines and mesenteric glands.

35. Typhus fever. Typhus.
A continued fever, characterized by prostration, and a general dusky, mottled rash, without specific lesion of the bowels.

36. Cerebro-spinal fever. Febris cerebro-spinalis. *Syn.* Epidemic cerebro-spinal meningitis; Epidemic meningitis; Spotted fever.
A malignant epidemic fever, often attended by painful contraction of the muscles of the neck and retraction of the head, and frequently accompanied by a profuse purpuric eruption. Lesions of the brain and spinal cord and their membranes are generally found on dissection.

37. Plague. Pestis.

A specific fever, attended with bubo of the inguinal or other glands, and occasionally with carbuncles.

38. Smallpox. Variola.

a. Distinct smallpox. Variola discreta. *Syn.* Discrete.

All the pustules separate.

b. Confluent smallpox. Variola confluens.

Pustules running together over the greater part of the body.

c. Modified smallpox. Variola modificata. *Syn.* Varioloid.

With pustules modified in their development by previous vaccination, smallpox, or other cause.

39. Vaccine. Vaccinia. *Syn.* Cowpox.

40. Chickenpox. Varicella.

41. Measles. Morbilli.

42. German measles. Rubeola Germanica. *Syn.* Rötheln.

Distinguished from measles by the somewhat earlier appearance of the eruption, its lighter red color, its more regular outline, and by not protecting against the occurrence of measles.

43. Scarlet fever. Scarlatina.

a. Simple. Simplex.

b. Anginose. Anginosa.

A form of the disease with redness, swelling, and ulceration of the throat.

c. Malignant. Maligna.

A malignant form of the disease, in which the rash is either absent or but partially developed, and when developed is of a purplish hue.

44. Erysipelas. Erysipelas.

A specific fever, accompanied by an inflammation of the integument tending to spread, and characterized by an irregularly defined margin.

a. Phlegmonous erysipelas. Erysipelas phlegmonodes.

b. Erratic erysipelas. Erysipelas erraticum.

Very superficial and tending to spread indefinitely.

45. Dengue. Denguis. *Syn.* Break-bone fever.

An ephemeral fever, with frontal headache and severe pains in the limbs and trunk, and in some cases an eruption resembling that of measles.

46. Diphtheria. Diphtheria.

A specific febrile disease, with pseudo-membranous exudation on a mucous surface (generally of the mouth, fauces, and air-passages), or occasionally on a wound.

47. Influenza. Catarrhus epidemicus.

48. Glanders. Equinia.

An inflammatory affection of the nasal mucous membrane, produced by contagious matter from a glandered horse.

49. Farcy. Farciminum.

An inflammatory affection of the skin and of the absorbent system, produced by contagious matter from a horse having farcy.

50. Grease. Equinia mitis.

A pustular eruption, produced by contagious matter from a horse affected with the grease.

51. Puerperal fever. Febris puerperalis.

A continued fever, communicable by contagion, occurring in connection with child-birth.

52. Rheumatism. Rheumatismus.

a. Acute rheumatism. Rheumatismus acutus. *Syn.* Rheumatic fever.

A febrile disorder, characterized by non-suppurative inflammation of the fibrous tissues of the joints.

b. Subacute rheumatism. Rheumatismus subacutus.

c. Muscular rheumatism. Rheumatismus muscularis.

Lumbago. Lumbago.

Stiff neck. Torticollis.

Pleurodynia. Pleurodynia.

d. Gonorrhœal rheumatism. Rheumatismus gonorrhöicus.

An analogous affection associated with gonorrhœa.

e. Chronic rheumatism. Rheumatismus chronicus.

53. Gout. Podagra.

a. Acute gout. Podagra acuta.

A specific febrile disorder, characterized by non-suppurative inflammation, affecting especially the smaller joints, and generally appearing first in the large joint of the great toe, and attended with excess of uric acid in the blood.

b. Chronic gout. Podagra chronica.

A persistent gout, with little or no fever, characterized by stiffness and swelling of various joints, with deposits of urate of soda.

c. Nervous gout. Podagra nervosa. *Syn.* Irregular gout.

54. Chronic osteo-arthritis. Osteo-arthritis chronica. *Syn.* Rheumatic gout; Rheumatoid arthritis.

An affection characterized by pain and stiffness, with deformity of one or more of the joints from alteration of the bony structure.

55. Syphilis. Syphilis.

a. Primary syphilis. Syphilis primaria.

Syphilis while limited to the part inoculated and the lymphatic glands connected with it.

b. Secondary syphilis. Syphilis secundaria.

Syphilis when it has affected the system.

c. Hereditary syphilis. Syphilis hereditaria.

Constitutional syphilis of the child, derived during fœtal life from one of the parents.

56. Diabetes. Diabetes. *Syn.* Diabetes mellitus.

57. Beri-beri. Beriberia.

58. Cancer. Carcinoma.

A malignant disease, characterized by a growth which tends to spread indefinitely into the surrounding structures and in the course of the lymphatics of the part affected, and which is frequently developed in other parts of the body.

a. Scirrhus. Scirrhus. *Syn.* Hard cancer.

Cancer characterized by hardness of the primary tumor, and by a tendency to draw to itself the neighboring soft structures. When ulcerated, the sore is commonly deep, uneven, and bounded by a thick everted hard edge.

b. Medullary cancer. Carcinoma medullosum. *Syn.* Soft cancer; Encephaloid.

Cancer characterized by a smoothly-lobed surface, soft, irregular consistence, great vascularity, and usually rapid growth and reproduction. When ulcerated it protrudes in large masses, which bleed copiously.

Fungus hæmatodes.

A form of medullary cancer, characterized by interstitial hemorrhage.

c. Epithelial cancer. Epithelioma. *Syn.* Cancroid.

Cancer characterized by its frequent occurrence in parts supplied with epithelium, and by the resemblance of its cells to those of epithelium.

d. Osteoid cancer. Carcinoma osteoides.

Cancer usually occurring in bones, containing a large proportion of bone, and followed by similar or by ordinary encephaloid growths in the glands and viscera.

e. Colloid cancer. Carcinoma collodes. *Syn.* Alveolar cancer.

A cancerous growth, a great part of which is formed of transparent or gelatinoid substance.

NON-MALIGNANT TUMORS AND CYSTS.

TUMORES NON MALIGNI. CYSTES NON MALIGNÆ.

NOTE.—*In reporting cases of non-malignant tumor, the organ or region in which the growth occurs should be specified.*

59. Fibrous tumor. Tumor fibrosus. *Syn.* Fibroma.

A growth, which in its structure resembles fibrous tissue, and which is circumscribed, or, in other words, does not invade surrounding structures.

a. Fibro-cystic tumor. Tumor fibro-cysticus.

A fibrous tumor containing cysts.

b. Fibro-calcareous tumor. Tumor fibro-calcareus.

A fibrous tumor containing earthy matter.

c. Fibro-muscular tumor. Tumor fibro-musculosus. *Syn.* Myoma.

A fibrous tumor containing involuntary muscle, as in the uterine fibroid.

d. Fibro-fatty tumor. Tumor fibro-adiposus.

A fibrous tumor containing fat.

e. Neuroma. Neuroma.

A fibrous tumor developed on or between the fibres of a nerve.

f. Painful subcutaneous tumor or tubercle. Tumor subcutaneus dolens.

A painful fibrous tumor in the subcutaneous tissue.

60. Fibro-cellular tumor. Tumor fibro-cellulosus.

A growth which in its structure resembles areolar or connective tissue.

Note.—When the fibro-cellular tumor occurs as a pendulous outgrowth from a mucous surface, it constitutes a common variety of Polypus.

61. Sarcoma. Sarcoma.

Consisting chiefly of cells, and resembling embryonic connective tissue.

62. Myxoma. Myxoma.

Resembling the mucous tissue of the umbilical cord.

63. Glioma. Glioma.

Containing numerous small round cells, and originating in the neuroglia of the brain, auditory nerve, or retina.

64. Fibro-nucleated tumor. Tumor fibro-nucleosus.

A tumor composed of fibrous tissue mixed with elongated nuclei.

65. Fibro-plastic tumor. Tumor fibro-plasticus.

A tumor composed chiefly of fusiform or spindle-shaped cells.

Note.—The fibro-nucleated and fibro-plastic tumors are also called Spindle-celled sarcoma; and, when recurring after repeated removal, Recurrent fibroid, Sarcoma fusocellulare, Tumor fibrosus recurrens.

66. Myeloid tumor. Tumor myelodes. *Syn.* Colossal-celled or giant-celled sarcoma.

A tumor occurring usually in connection with bone, and containing a large proportion of many-nucleated cells like those found in fœtal marrow.

67. Fatty tumor. Tumor adiposus. *Syn.* Lipoma.

68. Osseous tumor, or bony tumor. Tumor osseus.

a. Osseous tumor of bone. Tumor osseus ossis. *Syn.* Exostosis.

Ivory-like. Eberneus.

Cancellated. Cancellatus.

Diffused. Diffusus. *Syn.* Osteoma.

b. Osseous tumor of the soft parts. Tumor osseus partium mollium.

69. Cartilaginous tumor. Tumor cartilaginosus. *Syn.* Enchondroma.

a. Fibro-cartilaginous tumor. Tumor fibro-cartilaginosus.

70. Glandular tumor. Tumor glandulosus. *Syn.* Adenoma; Adenoid tumor; Adenocele.

A tumor growing in or near a gland, and more or less perfectly resembling it in structure.

a. Lymphoid tumor. Lymphoma.

Composed of corpuscles resembling the cell-elements of lymphatic glands.

71. Vascular or erectile tumor. Tumor vasculosus. *Syn.* Angeioma.

a. Aneurism by anastomosis, or Racemose aneurism. Aneurysma racemosum.

b. Nævus. Nævus.

c. Lymphatic vascular tumor. Tumor lymphaticus vasculosus.

72. Molluscum. Molluscum.

73. Warty tumor and warts. Tumor verrucosus et verrucæ.

74. Condyloma. Condyloma.

75. Keloid or Cheloid. Tumor cheloides.

76. Villous tumor. Tumor villosus. *Syn.* Papillary tumor; Papilloma.

77. Polypus. Polypus.

A pedunculated tumor growing from a mucous surface.

78. Simple or barren cysts. Cystes simplices *sive* infœcundæ.

a. Serous cyst. Cystis serosa.

b. Synovial cyst. Cystis synovialis. *Syn.* Bursal cyst.

c. Mucous cyst. Cystis mucosa.

d. Suppurating cyst. Cystis suppurans.

e. Sanguineous cyst. Cystis sanguinea.

f. Hemorrhagic cyst. Cystis hæmorrhagica.

g. Aneurismal cyst. Cystis aneurysmica.

h. Oily cyst. Cystis oleosa.

i. Colloid or gelatinous cyst. Cystis collodes *sive* glutinosa.

k. Seminal cyst. Cystis seminalis.

79. Compound or proliferous cysts. Cystes compositæ *sive* fœcundæ.

a. Complex cystic tumor. Tumor cysticus multiplex.

Complex cystigerous cyst. Cystis cystigera multiplex.

With vascular intracystic growths. Intus innascente materiâ morbidâ vasculosâ.

b. Cutaneous proliferous cyst. Cystis cutigera.

Sebaceous tumor or cyst. Tumor sebaceus *sive* cystis sebacea.

Cholesteatoma. Cholesteatoma.

Piliferous or dermoid cyst. Cystis pilosa *sive* dermatodes.

c. Dentigerous cyst. Cystis dentigera.

LOCAL DISEASES.
MORBI PARTIUM SINGULARUM.

ARRANGEMENT OF LOCAL DISEASES.
ORDO MORBORUM.

DISEASES OF THE DIGESTIVE SYSTEM.
MORBI APPARATUS DIGESTIONIS.

DISEASES OF THE MOUTH.
MORBI ORIS.

80. Harelip. Labrum leporinum.

81. Stomatitis. Stomatitis. *Syn.* Inflammation of the mouth.

82. Ulcerative stomatitis. Stomatitis exulcerans.

83. Vesicular stomatitis. Stomatitis vesiculosa. *Syn.* Aphthæ.

84. Gangrenous stomatitis. Stomatitis gangrenosa. *Syn.* Cancrum oris; Gangræna oris.

85. Diphtheric stomatitis. Stomatitis diphtherica.

86. Thrush. Stomatitis parasitica. *Syn.* Muguet.
An exudation dependent upon or connected with a parasitic growth.*

87. Mercurial stomatitis. Stomatitis mercurialis. *Syn.* Ptyalismus mercurialis.

* Oidium albicans. (Link.)

88. Stomatorrhœa. Stomatorrhœa.
Excessive flow of liquid from the mouth.

89. Hemorrhage of the mouth. Stomatorrhagia.

90. Ranula. Ranula.

DISEASES OF THE GUMS.
MORBI GINGIVARUM.

91. Gingivitis. Gingivitis. *Syn.* Inflammation of the gums.

92. Atrophy. Atrophia.

93. Gumboil. Abscessus gingivarum.

94. Epulis. Epulis.

DISEASES OF THE JAWS.
MORBI MAXILLARUM.

95. Adhesions of the jaws. Maxillarum adhæsus.

96. Abscess of the antrum. Abscessus antri.

97. Cyst of the antrum. Cystis antri. *Syn.* Dropsy of the antrum.

98. Tumor of the antrum. Tumor antri.

99. Alveolitis. Alveolitis. *Syn.* Inflammation of the alveoli.

100. Alveolar abscess. Abscessus alveolaris.

101. Necrosis of the alveoli. Necrosis alveolorum.

102. Caries of the alveoli. Caries alveolorum.

103. Exostosis of the alveoli. Exostosis alveolorum.

104. Dentigerous cyst of the alveoli. Cystis dentigera alveolorum.

105. Atrophy of the alveoli. Atrophia alveolorum.

106. Rheumatism of the jaws. Rheumatismus maxillarum.

107. Phosphoric inflammation and necrosis of the jaw. Inflammatio et necrosis maxillæ ex phosphoro.

AFFECTIONS OF THE TEETH.
MORBI DENTIUM.

108. Teething. Dentitio.

109. Irregular dentition. Dentitio inordinata.
Note.—Under irregularities are included time of appearance, position, number, form, and development of temporary and permanent teeth.

110. Caries. Caries.

111. Necrosis. Necrosis.

112. Exostosis. Exostosis.

113. Atrophy. Atrophia.

114. Inflammation of the dental pulp. Inflammatio medullæ dentium.

115. Inflammation of the dental periosteum. Inflammatio periostei dentium.

116. Chronic thickening. Crassitudo chronica.

117. Rheumatic inflammation. Inflammatio rheumatica.

DISEASES OF THE TONGUE.

MORBI LINGUÆ.

118. Glossitis. Glossitis.
Inflammation of the substance of the tongue.

119. Ulcer of the tongue. Ulcus linguæ.

120. Tongue-tie. Lingua frænata.

121. Hypertrophy. Hypertrophia.

DISEASES OF THE FAUCES AND PALATE.

MORBI FAUCIUM ET PALATI.

122. Angina. Angina. *Syn.* Sore throat.
Inflammation of the mucous membrane of the fauces.

123. Elongated uvula. Uvula elongata.

124. Perforation of the palate. Palatum perforatum.

125. Cleft palate. Palatum fissum.

126. Tonsillitis. Tonsillitis. *Syn.* Inflammation of the tonsils.

127. Suppurative tonsillitis. Tonsillitis suppurans. *Syn.* Quinsy; Cynanche tonsillaris.

128. Enlarged tonsils. Tonsillæ amplificatæ.

129. Ulcerated throat. Angina ulcerosa. *Syn.* Ulcerated sore throat.

130. Malignant sore throat. Angina maligna. *Syn.* Putrid sore throat; Cynanche maligna.

131. Diphtheric angina. Angina diphtherica.

DISEASES OF THE PHARYNX.
MORBI PHARYNGIS.

132. Pharyngitis. Pharyngitis.

133. Abscess of the pharynx. Abscessus pharyngis.

134. Ulcerative pharyngitis. Pharyngitis ulcerosa.

135. Malignant pharyngitis. Pharyngitis maligna. *Syn.* Pharyngitis gangrenosa.

DISEASES OF THE ŒSOPHAGUS.
MORBI ŒSOPHAGI.

136. Œsophagitis. Œsophagitis.

137. Stricture of the œsophagus. Strictura œsophagi.

138. Difficulty of swallowing. Dysphagia.

DISEASES OF THE STOMACH.
MORBI VENTRICULI.

139. Gastritis. Gastritis.
Inflammation of the mucous membrane of the stomach.

140. Chronic ulcer of the stomach. Ulcus chronicum ventriculi.

141. Hemorrhage of the stomach. Hæmorrhagia gastrica.

142. Perforation of the stomach. Ventriculus perforatus.

143. Dilatation of the stomach. Ventriculi dilatatio.

144. Cancer of the stomach. Carcinoma ventriculi

145. Stricture of the cardia. Strictura cardiæ.

146. Stricture of the pylorus. Strictura pylori.

147. Gastric fistula. Fistula ventriculi.

148. Hernia of the stomach. Hernia ventriculi. *Syn.* Gastrocele.

149. Indigestion. Dyspepsia.

150. Gastralgia. Gastralgia. *Syn.* Gastrodynia.
Neuralgic pain of the stomach.

151. Spasm of the stomach. Spasmus ventriculi.

152. Pyrosis. Pyrosis. *Syn.* Water-brash.

153. Heartburn. Cardialgia.
Burning pain in the region of the stomach, without inflammation.

154. Vomiting. Vomitio.

155. Vomiting of blood. Hæmatemesis.

DISEASES OF THE INTESTINES.

MORBI INTESTINORUM.

156. Duodenitis. Duodenitis. *Syn.* Inflammation of the duodenum.

157. Enteritis. Enteritis.
Inflammation of the mucous membrane of the small intestines.

158. Typhlitis. Typhlitis.
Inflammation of the cæcum, or appendix vermiformis.

159. Dysentery. Dysenteria.

160. Diarrhœa. Diarrhœa.

161. Cholera morbus. Cholera morbus.
Bilious vomiting and purging.

162. Epidemic cholera. Cholera epidemica. *Syn.* Asiatic cholera; Malignant cholera.
An epidemic disease, characterized by vomiting and purging of a liquid resembling rice-water.

163. Cholera infantum. Cholera infantum. *Syn.* Summer complaint.
Cholera in children, dependent upon irritation or inflammation of the mucous follicles.

164. Ulceration of the intestines. Exulceratio intestinorum.

165. Perforation of the intestine. Intestinum perforatum.

166. Fecal abscess. Abscessus stercorosus.

167. Fistula. Fistula.
A fistulous opening of the intestine.

a. Fecal fistula. Fistula stercorosa. *Syn.* Artificial anus.

168. Vesico-intestinal fistula. Fistula vesico-intestinalis.

169. Hemorrhage of the intestines. Hæmorrhagia intestinorum.

170. Melæna. Melæna.

171. Obstruction. Obstructio.

a. From substances in the bowels. E contentis intestinorum.

b. From tumor. Ex tumore.

c. From stricture. E strictură.

d. From intussusception. Ex intussusceptione.

e. From twisting of the intestines. E volvulo.

f. From internal strangulation. E strangulatione internâ.
Mesenteric. Mesenterii.
Mesocolic. Mesocolii.
By a band or adhesions. Ex habenulâ *sive* adhæsibus.

172. Hernia. Hernia.
   a. Reducible. Reponendi patiens.
   b. Irreducible. Reponendi non patiens.
   c. Obstructed. Obstructa. *Syn.* Incarcerated.
   d. Inflamed. Inflammata.
   e. Strangulated. Strangulata.
      Diaphragmatic. Diaphragmatica.
      Epigastric. Epigastrica.
      Ventral. Ventralis.
      Umbilical. Umbilicaris.
      Lumbar. Lumbaris.
      Inguinal. Inguinalis.
      Scrotal. Scrotalis.
      Femoral. Femoralis. *Syn.* Crural.
      Obturator. Obturatoria.
      Perineal. Perinealis.
      Pudendal. Pudendalis.
      Vaginal. Vaginalis.
      Ischiatic. Ischiadica.

173. Cancer. Carcinoma.

174. Intestinal Worms. Vermes intestinales.

175. Colic. Colica.
   a. Flatulent colic. Colica e flatû.
   b. Bilious colic. Colica biliosa.
      Colic with disordered action of the liver.
   c. Lead colic. Colica ex plumbo. *Syn.* Colica Pictonum; Painter's colic.

176. Constipation. Alvi astrictio.

177. Ulceration of the rectum. Exulceratio recti.

178. Ulceration of the anus. Exulceratio ani.

179. Abscess of the rectum. Abscessus recti.

180. Fistula in ano. Fistula in ano.

181. Recto-vesical fistula. Fistula recto-vesicalis.

182. Recto-urethral fistula. Fistula recto-urethralis.

183. Recto-vaginal fistula. Fistula recto-vaginalis.

184. Hemorrhoids. Hæmorrhoides. *Syn.* Piles.

185. Hemorrhage from the rectum. Hæmorrhagia e recto.

186. Fissure of the anus. Fissura ani. *Syn.* Painful ulcer of the anus.

187. Prolapsus ani. Prolapsus ani.

188. Stricture of the rectum. Strictura recti.

189. Warts of the anus. Verrucæ ani. *Syn.* Condyloma.

190. Cancer of the rectum. Carcinoma recti.
Cancer involving the rectum or anus, or both.

191. Neuralgia of the rectum and anus. Neuralgia ani et recti.

192. Spasm of the anus. Spasmus ani.

193. Itching of the anus. Pruritus ani.

DISEASES OF THE PERITONEUM.

MORBI PERITONÆI.

194. Peritonitis. Peritonitis.

a. Chronic peritonitis. Peritonitis chronica.

b. Tubercular peritonitis. Peritonitis tuberculosa.

c. From perforation. Ex perforatione.

195. Ascites. Ascites. *Syn.* Dropsy of the peritoneum.

DISEASES OF THE ABSORBENT SYSTEM.

MORBI APPARATUS ABSORPTIONIS.

DISEASES OF LYMPHATICS AND LYMPHATIC GLANDS.

MORBI VASORUM LYMPHIFERORUM ET GLANDULARUM LYMPHALIUM.

196. Inflammation of the lymphatics. Angeioleucitis.

197. Inflammation of the glands. Adenitis.

a. Syphilitic bubo. Inguen syphiliticum. *Syn.* Multiple indurated bubo.

b. Chancroidal bubo. Inguen virulentum. *Syn.* Virulent bubo.

198. Hypertrophy of the glands. Hypertrophia glandularum.

199. Atrophy of the glands. Atrophia glandularum

200. Lymphatic fistula. Fistula lymphalis.

201. Obstruction of the thoracic duct. Ductûs thoracis obstructio.

202. Obstruction, obliteration, and varicosity of lymphatics. Vasorum lymphiferorum obstructio, obliteratio, et varicositas.

203. Bursting of lymphatics. Vasorum lymphiferorum ruptio.

DISEASES OF MESENTERIC GLANDS.
*MORBI GLANDULARUM MESENTERII.**

DISEASES OF THE CIRCULATORY SYSTEM.
MORBI SANGUINIS APPARATUS.

DISEASES OF THE HEART.
MORBI CORDIS.

DISEASES OF THE PERICARDIUM.
MORBI PERICARDII.

204. Pericarditis. Pericarditis.

205. Adhesion of the pericardium. Pericardii adhæsio.

206. Dropsy of the pericardium. Hydrops pericardii.

DISEASES OF THE ENDOCARDIUM.
MORBI ENDOCARDII.

207. Endocarditis. Endocarditis.

208. Valve-disease. Morbi valvarum.

a. Aortic. Aorticarum.

b. Mitral. Mitralium.

c. Pulmonic. Pulmonalium.

d. Tricuspid. Tricuspidum.

Varieties.

Vegetations. Excrescentia.

Fibroid thickening. Crassitudo fibrosa.

Fatty degeneration. Degeneratio adiposa. *Syn.* Atheroma.

Calcareous degeneration. Degeneratio calcarea. *Syn.* Ossification.

Aneurism. Aneurysma.

Laceration. Laceratio.

* See Diseases of the Blood-making Glands.

Simple dilatation of orifice. Dilatatio simplex ostiorum.

Malformations. Deformitates congenitæ.

209. Fibrinous concretions of the heart. Coagula cordis fibrinosa. *Syn.* Heart-clot.

DISEASES OF THE MUSCULAR STRUCTURE OF THE HEART.
MORBI MUSCULORUM CORDIS.

210. Myocarditis. Myocarditis.

211. Abscess. Abscessus.

212. Hypertrophy. Hypertrophia.
   a. Of left side. Lateris sinistri.
   b. Of right side. Lateris dextri.

213. Dilatation. Dilatatio.
   a. Of left side. Lateris sinistri.
   b. Of right side. Lateris dextri.

214. Atrophy. Atrophia.

215. Fatty heart. Cordis pinguitudo.

216. Fatty degeneration of the heart. Degeneratio cordis adiposa.

217. Fibroid degeneration of the heart. Degeneratio cordis fibrosa.

218. Aneurism. Aneurysma.

219. Rupture of the heart. Diruptio cordis.

220. Disease of the coronary arteries. Morbus arteriarum coronarium.

221. Malformations. Deformitates congenitæ.

222. Angina pectoris. Angina pectoris.

223. Syncope. Syncope.

224. Palpitation and irregularity of the action of the heart. Palpitatio et tumultus cordis.

DISEASES OF THE BLOODVESSELS.
MORBI VASORUM SANGUIFERORUM.

NOTE.—*The vessel affected should in all cases be specified.*

DISEASES OF THE ARTERIES.
MORBI ARTERIARUM.

225. Arteritis. Arteritis.

226. Fatty degeneration of the arteries. Degeneratio adiposa arteriarum. *Syn.* Atheroma.

227. Calcareous degeneration. Degeneratio calcarea. *Syn.* Ossification.

228. Narrowing and obliteration of an artery. Arteriæ coarctatio et obliteratio.

229. Occlusion of an artery. Arteriæ occlusio.

a. From compression. Ex compressione.

b. From impaction of coagula. Ex impactis coagulis.

Thrombosis. Thrombosis.
Local coagulation.

Embolism. Embolismus.
Coagula conveyed from a distance.

230. Dilatation of an artery. Dilatatio arteriæ.

231. Aneurism. Aneurysma.

a. Fusiform. Fusiforme.

b. Saccular. Sacculatum.

c. Diffused. Diffusum.
Sac formed by the surrounding tissues.

232. Rupture of an artery. Diruptio arteriæ.

a. From disease of the artery. Ex arteriæ vitio.

b. From disease external to the artery. Ex morbo extraneo.

233. Dissecting aneurism. Aneurysma dissecans.

234. Traumatic aneurism. Aneurysma ex vulnere.

235. Arterio-venous aneurism. Aneurysma arterio venosum.

236. Aneurismal varix. Varix aneurysmicus.

a. Traumatic. Ex vulnere.

b. Spontaneous. Spontaneus.

237. Varicose aneurism. Aneurysma varicosum.

a. Traumatic. Ex vulnere.

b. Spontaneous. Spontaneum.

238. Cirsoid aneurism. Aneurysma cirsoides. *Syn.* Arterial varix.

239. Aneurism by anastomosis. Aneurysma ex anastomosi.

240. Malformations. Deformitates congenitæ.

241. Cyanosis. Cyanosis.

242. Contraction or obliteration of the commencement of the descending aorta. Coarctatio vel occlusio capitis aortæ descendentis.

DISEASES OF THE VEINS.
MORBI VENARUM.

243. Phlebitis. Phlebitis. *Syn.* Inflammation of the veins.

244. Phlegmasia dolens. Phlegmasia dolens. *Syn.* Milk-leg.

245. Fibrinous concretions in the veins. Coagula venarum fibrinosa.

246. Obstruction of the veins. Obstructio venarum.

247. Obliteration of the veins. Obliteratio venarum.

248. Phlebolites. Phlebolithi.

249. Varicose veins. Varices.

250. Vascular nævus. Nævus vasculosus.

251. Parasitic disease. Morbus parasiticus.

DISEASES OF THE RESPIRATORY SYSTEM.
MORBI APPARATUS RESPIRATIONIS.

252. Catarrh. Catarrhus.

253. Summer catarrh. Catarrhus æstivus. *Syn.* Hay asthma.
Periodical catarrh, occurring in certain individuals annually, usually in the summer season.

254. Influenza. Catarrhus epidemicus.

255. Whooping-cough. Pertussis.

DISEASE OF THE NOSTRILS.
MORBUS NARIUM.

255*a*. Coryza. Coryza. *Syn.* Nasal catarrh.

DISEASES OF THE LARYNX.
MORBI LARYNGIS.

256. Epiglottitis. Epiglottitis.

257. Ulcer of the epiglottis. Ulcus epiglottidis.

258. Laryngeal catarrh. Catarrhus laryngis.

259. Laryngitis. Laryngitis.
a. Acute. Acuta.
b. Chronic. Chronica.

260. Catarrhal croup. Laryngitis spasmodica.

261. Pseudo-membranous croup. Laryngitis pseudo-membranacea.

262. Laryngeal ulcer. Ulcus laryngis.

263. Laryngeal abscess. Abscessus laryngis.

264. Œdema of the glottis. Œdema glottidis.

265. Necrosis of the cartilages. Necrosis cartilaginum.

266. Stricture of the larynx. Strictura laryngis.

267. Tuber. Tuber. *Syn.* Warty growth; Tuber verrucosum.

268. Polypus. Polypus.

269. Cyst of the larynx. Cystis laryngis.

270. Malformations. Deformitates congenitæ.

271. Aphonia. Aphonia.

272. Paralysis of the glottis. Paralysis glottidis.

273. Spasm of the glottis. Spasmus glottidis.

274. Laryngismus stridulus. Laryngismus stridulus. *Syn.* Crowing disease of children.

DISEASES OF THE TRACHEA AND BRONCHI.
MORBI TRACHEÆ ET BRONCHIORUM.

275. Tracheitis. Tracheitis.

276. Necrosis of the tracheal cartilages. Necrosis cartilaginum tracheæ.

277. Bronchial catarrh. Catarrhus bronchialis.

278. Bronchitis. Bronchitis.

a. Acute. Acuta.

b. Chronic. Chronica.

c. Capillary. Capillaris.

279. Bronchial ulcer. Ulcus bronchialis.

280. Dilatation. Dilatatio.

281. Stricture. Strictura.

282. Tumors. Tumores.

283. Parasitic disease. Morbus parasiticus.

284. Malformations. Deformitates congenitæ.

285. Asthma. Asthma.

DISEASES OF THE LUNG.
MORBI PULMONIS.

286. Pneumonia. Pneumonia.
   a. Acute. Acuta.
   b. Chronic. Chronica.
287. Abscess of the lung. Abscessus pulmonis.
288. Gangrene of the lung. Gangræna pulmonis.
289. Active congestion. Congestio activa.
290. Passive congestion. Congestio passiva.
291. Pulmonary apoplexy. Apoplexia pulmonalis.
292. Hæmoptysis. Hæmoptysis.
293. Œdema of the lung. Œdema pulmonis.
294. Cirrhosis of the lung. Cirrhosis pulmonis.
295. Emphysema of the lung. Emphysema pulmonis.
   a. Vesicular. Vesiculare.
   b. Interlobular. Interlobulare.
296. Atelectasis. Atelectasis.
   Imperfect expansion of the lung, in a new-born child.
297. Collapse of the lung. Collapsus pulmonis.
298. Acute pneumonic phthisis. Phthisis pneumonica acuta.
299. Chronic pneumonic phthisis. Phthisis pneumonica chronica.
300. Acute tuberculous phthisis. Phthisis tuberculosa acuta.
301. Chronic tuberculous phthisis. Phthisis tuberculosa chronica.
302. Millstone-makers' phthisis. Phthisis fabrum molariorum.
303. Grinders' asthma. Asthma cultrariorum.
304. Miners' asthma. Asthma metallariorum.
305. Parasitic disease. Morbus parasiticus.
306. Malformations. Deformitates congenitæ.

DISEASES OF THE PLEURA.
MORBI PLEURÆ.

307. Pleurisy. Pleuritis.
308. Chronic pleurisy. Pleuritis chronica.
309. Tuberculous pleurisy. Pleuritis tuberculosa.
310. Empyema. Empyema.

311. Hydrothorax. Hydrothorax.
Dropsy of the pleura.

312. Pneumothorax. Pneumothorax.

313. Tumors. Tumores.

DISEASES OF THE MEDIASTINUM.
MORBI MEDIASTINI.

314. Abscess of the mediastinum. Abscessus mediastini.

315. Tumors. Tumores.

DISEASES OF THE BRONCHIAL GLANDS.
MORBI GLANDULARUM BRONCHIALIUM.

316. Inflammation of the bronchial gland. Inflammatio glandularum bronchialium.

317. Abscess. Abscessus.

318. Enlargement. Amplificatio.

319. Cancer. Carcinoma.

320. Tubercle. Tubercula.

321. Anthrakosis. Anthrakosis. *Syn.* Carbonaceous deposit.

DISEASES OF THE SECRETORY SYSTEM.
MORBI APPARATUS SECRETIONIS.

DISEASES OF THE LACHRYMAL GLAND.*
MORBI GLANDULÆ LACHRYMALIS.

DISEASES OF THE PAROTID GLAND.
MORBI GLANDULÆ PAROTIDIS.

322. Parotitis. Parotitis. *Syn.* Parotid bubo.

323. Mumps. Cynanche parotidea. *Syn.* Contagious parotitis.

324. Abscess of the parotid gland. Abscessus parotidis.

325. Salivary fistula. Fistula salivosa.

DISEASES OF THE SUBMAXILLARY GLAND.
MORBI GLANDULÆ SUBMAXILLARIS.

326. Inflammation of the submaxillary gland. Inflammatio glandulæ submaxillaris.

327. Abscess of the submaxillary gland. Abscessus glandulæ submaxillaris.

* See Diseases of the Eye.

DISEASES OF THE SUBLINGUAL GLAND.

MORBI GLANDULÆ SUBLINGUALIS.

328. Inflammation of the sublingual gland. Inflammatio glandulæ sublingualis.

329. Abscess of the sublingual gland. Abscessus glandulæ sublingualis.

330. Salivary calculus. Calculus salivosus.

DISEASES OF THE PANCREAS.

MORBI PANCREATIS.

331. Pancreatitis. Pancreatitis.

332. Abscess of the pancreas. Abscessus pancreatis.

333. Calculus of the pancreas. Calculus pancreatis.

334. Cancer of the pancreas. Carcinoma pancreatis.

DISEASES OF THE LIVER.

MORBI HEPATIS.

335. Perihepatitis. Perihepatitis.
Inflammation of the investing membrane of the liver.

336. Hepatitis. Hepatitis.

337. Chronic hepatitis. Hepatitis chronica.

338. Abscess of the liver. Abscessus hepatis.

339. Acute atrophy of the liver. Atrophia acuta hepatis.

340. Congestion of the liver. Congestio hepatis.

341. Cirrhosis of the liver. Cirrhosis hepatis.

342. Fatty liver. Hepar adiposum.

343. Fatty degeneration of the liver. Degeneratio hepatis adiposa.

344. Lardaceous degeneration of the liver. Degeneratio hepatis lardacea. *Syn.* Amyloid disease of the liver; Waxy liver.

345. Fibroid disease of the liver. Morbus fibrosus hepatis.

346. Cancer of the liver. Carcinoma hepatis.

347. Tumors of the liver. Tumores hepatis.

348. Cyst of the liver. Cystis hepatis.

349. Hydatid cyst of the liver. Cystis hydatica hepatis.

350. Malformations of the liver. Deformitates congenitæ hepatis.

351. Jaundice. Icterus.

352. Obstruction of the portal vein. Venæ portarum obstructio.

DISEASES OF THE HEPATIC DUCTS.
MORBI DUCTUUM HEPATIS.

353. Inflammation of the hepatic ducts. Inflammatio ductuum hepatis.

354. Perforation of the hepatic ducts. Ductûs hepatis perforati.

355. Biliary fistula. Fistula biliosa.

356. Obstruction of the hepatic ducts. Obstructio ductuum hepatis.

357. Cancer of the hepatic ducts. Carcinoma ductuum hepatis.

358. Biliary calculi. Calculi biliosi.

359. Hepatic colic. Colica hepatica.
Painful passage of gall-stones through the duct.

DISEASES OF THE GALL-BLADDER.
MORBI VESICULÆ FELLIS.

360. Inflammation of the gall-bladder. Inflammatio vesiculæ fellis.

361. Perforation of the gall-bladder. Vesicula fellis perforata.

362. Biliary fistula. Fistula biliosa.

363. Biliary calculi. Calculi biliosi.

364. Cancer of the gall-bladder. Carcinoma vesiculæ fellis.

DISEASES OF THE URINARY SYSTEM.
MORBI URINÆ APPARATUS.

DISEASES OF THE KIDNEY.
MORBI RENUM.

365. Nephritis. Nephritis.
Inflammation of the substance of the kidneys.

366. Pyelitis. Pyelitis.
Inflammation of the pelvis of the kidney.

367. Perinephritis. Perinephritis.
Inflammation of the investing membrane.

368. Renal cachexia. Cachexia renalis. *Syn.* Bright's disease; Albuminuria.

a. Acute desquamative nephritis. Nephritis desquamans acuta. *Syn.* Acute Bright's disease; Acute albuminuria.

b. Chronic desquamative nephritis. Nephritis desquamans chronica. *Syn.* Chronic Bright's disease.

c. Granular kidney. Renes granulosi. *Syn.* Contracted granular kidney; Gouty kidney.

d. Fatty degeneration of the kidney. Degeneratio adiposa renis.

e. Lardaceous degeneration of the kidney. Degeneratio lardacea renis. *Syn.* Waxy kidney; Amyloid disease.

f. Fibroid degeneration of the kidney. Degeneratio fibrosa renis.

369. Hydronephrosis. Hydronephrosis. *Syn.* Dropsy of the kidney.
A dilatation of the pelvis and glandular substance of the kidney into one or more cysts, by retained secretion.

370. Hypertrophy of the kidney. Hypertrophia renis.

371. Atrophy of the kidney. Atrophia renis.

372. Cancer of the kidney. Carcinoma renis.

373. Cyst of the kidney. Cystis renis.

374. Tubercle of the kidney. Tubercula renis.

375. Parasitic disease of the kidney. Morbus parasiticus renis.

376. Calculus of the kidney. Calculus renis.

377. Nephritic colic. Colica nephritica.
Painful passage of a calculus through the ureter.

378. Malformations of the kidney. Deformitates congenitæ renis.

379. Renal hæmaturia. Hæmaturia renalis. *Syn.* Hemorrhage of the kidney.

380. Suppression of urine. Ischuria renalis.

381. Diuresis. Diuresis. *Syn.* Excessive secretion of urine.

382. Floating kidney. Ren mobilis.

DISEASES OF THE BLADDER.
MORBI VESICÆ.

383. Cystitis. Cystitis. *Syn.* Inflammation of the bladder

384. Acute catarrh of the bladder. Catarrhus vesicæ acutus.

385. Chronic catarrh of the bladder. Catarrhus vesicæ chronicus.

386. Ulceration of the bladder. Exulceratio vesicæ.

387. Mortification of the bladder. Mortificatio vesicæ.

388. Vesico-intestinal fistula. Fistula vesico-intestinalis.

389. Recto-vesical fistula. Fistula recto-vesicalis.

390. Hypertrophy of the bladder. Hypertrophia vesicæ.

391. Dilatation of the bladder. Dilatatio vesicæ.

392. Sacculated bladder. Vesica sacculata.

393. Inversion of the bladder. Inversio vesicæ.

394. Extroversion of the bladder. Extroversio vesicæ.

395. Hernia of the bladder. Hernia vesicæ.

396. Cancer of the bladder. Carcinoma vesicæ.

397. Fibrous tumor of the bladder. Tumor fibrosus vesicæ.

398. Villous tumor of the bladder. Tumor villosus vesicæ.

399. Stone in the bladder. Calculus vesicæ.

a. Uric or lithic acid. Acidum uricum vel lithicum.

b. Urate of ammonia. Ammoniæ uras.

c. Uric oxide. Oxidum uricum. *Syn*. Xanthic oxide.

d. Oxalate of lime. Calcis oxalas. *Syn*. Mulberry calculus.

e. Cystic oxide. Oxidum cysticum.

f. Phosphate of lime. Calcis phosphas.

g. Triple phosphate. Phosphas triplex.

h. Fusible calculus. Calculus fusilis.

i. Carbonate of lime. Calcis carbonas.

k. Fibrinous calculus. Calculus fibrinosus.

l. Urostealith. Urosteatoma.

m. Blood calculus. Calculus sanguineus.

400. Vesical hæmaturia. Hæmaturia vesicalis.

401. Paralysis of the bladder. Paralysis vesicæ.

402. Irritation of the bladder. Vesicæ irritatio. *Syn*. Irritable bladder.

403. Spasm of the bladder. Spasmus vesicæ.

404. Neuralgia of the bladder. Neuralgia vesicæ.

405. Incontinence of urine. Urinæ incontinentia.

406. Retention of urine. Urinæ retentio.

407. Stillicidium of urine. Stillicidium urinæ. *Syn.* Stillicidium from distention; Overflow or dribbling of urine.

408. Rupture of the bladder. Vesica rupta.

DISEASES OF THE PROSTATE GLAND.
MORBI GLANDULÆ PROSTATÆ.

409. Prostatitis. Prostatitis.

a. Acute prostatitis. Prostatitis acuta.

b. Chronic prostatitis. Prostatitis chronica.

410. Prostatorrhœa. Prostatorrhœa.

411. Abscess of the prostate gland. Abscessus glandulæ prostatæ.

412. Hypertrophy of the prostate gland. Hypertrophia glandulæ prostatæ.

413. Atrophy of the prostate gland. Atrophia glandulæ prostatæ.

414. Non-malignant tumors of the prostate gland. Tumores glandulæ prostatæ non maligni.

415. Cyst of the prostate gland. Cystis glandulæ prostatæ.

416. Cancer of the prostate gland. Carcinoma glandulæ prostatæ.

417. Tubercle of the prostate gland. Tubercula glandulæ prostatæ.

418. Calculus of the prostate gland. Calculus glandulæ prostatæ.

GONORRHŒA AND ITS COMPLICATIONS.
GONORRHŒA ET ADDITAMENTA GONORRHŒÆ.

419. Gonorrhœa. Gonorrhœa.

420. Balanitis. Balanitis.
Inflammation of the lining membrane of the glans and prepuce.

421. Herpes of the prepuce. Herpes preputialis.

422. Phimosis. Phimosis.

423. Paraphimosis. Paraphimosis.

424. Gonorrhœal bubo. Inguen gonorrhöicum. *Syn.* Sympathetic bubo.

425. Lacunar abscess. Abscessus lacunarum.

426. Epididymitis. Epididymitis. *Syn.* Gonorrhœal orchitis; Swelled testicle.

427. Abscess of the testicle. Abscessus testiculi.

428. Abscess of the spermatic cord. Abscessus funiculi seminalis.

429. Warts. Verrucæ.

430. Gleet. Gonorrhœa chronica.

431. Gonorrhœal ophthalmia. Ophthalmia gonorrhöica.

432. Gonorrhœal iritis. Iritis gonorrhöica.

433. Gonorrhœal rheumatism. Rheumatismus gonorrhöicus.

DISEASES OF THE MALE URETHRA.

MORBI URETHRÆ VIRILIS.

434. Urethritis. Urethritis.

435. Stricture of the urethra. Strictura urethræ.

- *a.* Organic. Organica.
- *b.* Traumatic. Ex vulnere.
- *c.* Spasmodic. Spasmodica.
- *d.* Inflammatory. Ex inflammatione.

436. Ulcer of the urethra. Ulcus urethræ.

437. Urinary abscess. Abscessus urinalis.

438. Urinary fistula. Fistula urinalis.

439. Recto-urethral fistula. Fistula recto-urethralis.

440. Extravasation of urine. Extravasatio urinæ.

441. Impacted calculus. Calculus impactus.

442. Malformations of the urethra. Deformitates urethræ congenitæ.

DISEASES OF THE SKIN.

MORBI CUTIS.

443. Erythema.*

- *a.* Erythema læve.
- *b.* Erythema fugax. *Syn.* Volaticum.
- *c.* Erythema marginatum.
- *d.* Erythema papulatum.
- *e.* Erythema tuberculatum.
- *f.* Erythema nodosum.

444. Intertrigo.

* Where one name only is given, that one should be employed.

445. Roseola.
   a. Roseola æstiva.
   b. Roseola autumnalis.
   c. Roseola symptomatica.
   d. Roseola annulata.

446. Urticaria. *Syn.* Nettle-rash.
   a. Urticaria acuta.
   b. Urticaria chronica.
   c. Urticaria febrilis.
   d. Urticaria evanida.
   e. Urticaria perstans.
   f. Urticaria conferta.
   g. Urticaria subcutanea.
   h. Urticaria tuberculata.

447. Pellagra.

448. Acrodynia.

449. Prurigo.

450. Lichen.
   a. Lichen simplex.
   b. Lichen pilaris.
   c. Lichen circumscriptus.
   d. Lichen agrius.
   e. Lichen tropicus. *Syn.* Prickly heat.
   f. Lichen lividus.

451. Strophulus. *Syn.* Red gum; Tooth-rash.
   a. Strophulus intertinctus.
   b. Strophulus confertus.
   c. Strophulus candidus.

452. Pityriasis. Pityriasis capitis. *Syn.* Dandruff.
   a. Pityriasis versicolor.

453. Psoriasis.
   a. Psoriasis vulgaris.
   b. Psoriasis guttata.
   c. Psoriasis diffusa.
   d. Psoriasis gyrata.
   e. Psoriasis inveterata.

454. Lepra.

455. Miliaria.

a. Sudamina.

456. Herpes.

a. Herpes phlyctenodes.

b. Herpes circinatus.

c. Herpes iris.

d. Herpes zoster. *Syn.* Shingles; Zona.

457. Pemphigus. *Syn.* Pompholyx.

a. Pemphigus acutus.

b. Pemphigus chronicus.

458. Eczema.

a. Eczema simplex.

b. Eczema rubrum.

c. Eczema impetiginodes.

d. Eczema chronicum.

459. Impetigo.

a. Impetigo sparsa.

b. Impetigo confluens.

c. Impetigo figurata.

d. Impetigo larvalis.

460. Rupia.

a. Rupia simplex.

b. Rupia prominens.

c. Rupia escharotica.

461. Ecthyma.

462. Acne.

a. Acne punctata.

b. Acne indurata.

c. Acne rosacea.

d. Acne strophulosa. *Syn.* Strophulus albidus.

463. Sycosis. *Syn.* Mentagra.

464. Steatorrhœa.

a. Steatorrhœa simplex.

b. Steatorrhœa nigricans.

465. Ichthyosis.

a. Ichthyosis vera.

b. Ichthyosis cornea.

466. Scleroderma. *Syn.* Scleriasis.

467. Leucoderma. *Syn.* Vitiligo.

468. Albinismus. *Syn.* Albinism.

469. Chloasma.

470. Canities.

471. Melasma. *Syn.* Bronzed skin.

472. Lentigo. *Syn.* Ephelis; Freckles.

473. Silver stain of the skin. Macula argentea.
Discoloration produced by the internal use of salts of silver.

474. Chilblain. Pernio.

475. Frostbite. Ambusta ex frigore.

476. Ulcer. Ulcus.

477. Fissures. Fissuræ.

478. Boil. Furunculus.

479. Carbuncle. Carbunculus. *Syn.* Anthrax.

480. Malignant pustule. Pustula maligna.
A spreading gangrenous inflammation, commencing as a vesicle on exposed skin, characterized by peculiar hardness and fetor, and derived from cattle similarly diseased.

481. Onychia.
Inflammation of the matrix of the nail.

482. Onychia maligna.

483. Whitlow. Paronychia.

a. Thecal abscess. Abscessus thecarum.

484. Gangrene. Gangræna.

485. Phagedæna.
A condition of wounds or ulcers in which they spread with a sloughing surface.

486. Hospital gangrene. Phagedæna putris. *Syn.* Sloughing phagedæna.
A severe form of phagedæna in which the slough extends deeper than the surface.

487. Hypertrophy of the skin. Hypertrophia cutis.

488. Corn. Clavus.

489. Elephantiasis Arabum. *Syn.* Barbadoes leg.

490. Elephantiasis Græcorum. *Syn.* Leprosy.

491. Atrophy of the skin. Atrophia cutis.

a. Linear atrophy. Atrophia linearis.

b. Alopecia.

c. Atrophy of the nails. Atrophia unguium.

492. Fibro-cellular tumor of the skin. Tumor fibro-cellulosus cutis.

493. Fatty tumor of the skin. Tumor adiposus cutis.

494. Nævus. *Syn.* Port wine stain.

495. Nævus pilaris. *Syn.* Mole.

496. Sebaceous tumor. Tumor sebaceus.

a. Steatoma. Steatoma.

497. Horns. Cornua.

498. Warts. Verrucæ.

499. Condyloma.

500. Molluscum.

501. Keloid. Tumor cheloides.

502. Yaws. Frambœsia.

503. Delhi boil. Furunculus Delhinus.

504. Aleppo evil. Malum Aleppense. *Syn.* Aleppo button.

505. Lupus.

A spreading tuberculated affection of the skin, usually of the face, tending to destructive ulceration.

a. Simple lupus. Lupus non exedens.

b. Corroding lupus. Lupus exedens.

Characterized by the rapidity, depth, and extent of the ulceration, and by appearing, in rare cases, on other parts than the face.

506. Rodent ulcer. Ulcus erodens.

A destructive ulcer characterized by the extent and depth to which it spreads, and by the absence of preceding hardness and constitutional infection.

507. Ingrown nail. Unguis involutus.

508. Cicatrices.

509. Pruritus. Pruritus.

510. Ephidrosis. Ephidrosis.
Local perspiration.

511. Anidrosis. Anidrosis.
Deficient perspiration.

PARASITIC DISEASES OF THE SKIN.

MORBI CUTIS PARASITICI.

512. Tinea tonsurans. *Syn.* Ringworm; *Parasite*, Tricophyton tonsurans.

513. Tinea decalvans. *Syn.* Alopecia areata; Porrigo decalvans; *Parasite*, Microsporon Audouini.

514. Porrigo favosa. *Syn.* Favus; *Parasites*, Achorion Schœnleinii; Puccinia favi.

515. Pityriasis versicolor; *Parasite*, Microsporon furfur.

516. Plica polonica; *Parasite*, Tricophyton sporuloides.

517. Mycetoma. *Syn.* Madura foot; *Parasite*, Chionyphe Carteri.

518. Itch. Scabies; *Parasite*, Sarcoptes scabiei.

519. Phthiriasis. Phthiriasis. *Syn.* Lousy disease; *Parasite*, Pediculus tabescentium.

520. Irritation. Irritatio.

Caused by—

a. Head louse. Pediculus capitis.

b. Brow louse. Pediculus palpebrarum.

c. Body louse. Pediculus corporis.

d. Crab louse. Pediculus pubis.

e. Chigoe. Pulex penetrans.

f. Tick. Ixodes ricinus.

g. Flea. Pulex irritans.

h. Bed-bug. Cimex.

i. Harvest-bug. Leptothrix autumnalis.

k. Wasps, bees, and other stinging and poisonous insects. Crabones, apes, aliaque insecta aculeata et venenosa.

l. Nettles and other stinging plants. Urticæ, aliæque plantæ aculeatæ.

DISEASES OF THE CELLULAR TISSUE.
MORBI MEMBRANÆ CELLULOSÆ.

521. Inflammation of the cellular tissue. Inflammatio membranæ cellulosæ.

522. Diffuse inflammation of the cellular tissue. Inflammatio diffusa membranæ cellulosæ. *Syn.* Cellular erysipelas.

523. Abscess of the cellular tissue. Abscessus membranæ cellulosæ.

524. Inflammatory induration in the newly-born. Sclerema neonatorum.

525. Sloughing of the cellular tissue. Sphacelus membranæ cellulosæ.

526. Obesity. Obesitas.

527. Tumors of the cellular tissue. Tumores membranæ cellulosæ.

528. Parasitic disease of the cellular tissue. Morbus parasiticus membranæ cellulosæ.

529. Emphysema of the cellular tissue. Emphysema membranæ cellulosæ.

530. Acute anasarca. Anasarca acuta.

DISEASES OF THE BLOOD, AND OF THE BLOOD-MAKING GLANDS.
MORBI SANGUINIS ET GLANDULARUM SANGUIFICATIONIS.

531. Purpura. Purpura.

An acute disease, not usually attended by fever, characterized by purple spots of effused blood.

a. Simple. Simplex.

b. Hemorrhagic. Hæmorrhagica.

The disease when accompanied by hemorrhage from a mucous surface.

532. Scurvy. Scorbutus.

A chronic disease, caused by a deficiency of vegetable food, and characterized by sponginess of the gums, and by the occurrence of hard, livid patches under the skin.

533. Hæmophilia. Hæmophilia. The hemorrhagic diathesis.

534. Plethora. Plethora.

Increase of the blood, or in the proportion of its red corpuscles.

535. Anæmia. Anæmia.

Deficiency of the red corpuscles in the blood.

536. Leucocythæmia. Leucocythæmia.
Excess of white corpuscles in the blood.

537. Pyæmia. Pyæmia.
A morbid condition attended usually with the formation of puriform deposits in the viscera and other parts.

538. Chlorosis. Chlorosis. *Syn.* Green sickness.

DISEASES OF THE SPLEEN.
MORBI LIENIS.

539. Splenitis. Splenitis.

540. Abscess of the spleen. Abscessus lienis.

541. Congestion of the spleen. Congestio lienis.

542. Fibrinous deposit in the spleen. Deposita fibrinosa in liene.

543. Hypertrophy of the spleen. Hypertrophia lienis.

a. Miasmatic hypertrophy of the spleen. Hypertrophia miasmatica lienis. *Syn.* Ague cake.
Hypertrophy produced by miasmatic disease.

b. Splenic cachexia. Cachexia splenica. *Syn.* Splenic leucocythæmia.

544. Lardaceous spleen. Degeneratio lardacea lienis. *Syn.* Amyloid disease; Waxy spleen.

545. Cancer of the spleen. Carcinoma lienis.

546. Tubercle of the spleen. Tubercula lienis.

547. Parasitic disease of the spleen. Morbus parasiticus lienis. *Syn.* Hydatid of the spleen.

DISEASES OF THE MESENTERIC GLANDS.
MORBI GLANDULARUM MESENTERII.

548. Inflammation of the mesenteric glands. Inflammatio glandularum mesenterii.

549. Abscess of the mesenteric glands. Abscessus glandularum mesenterii.

550. Hypertrophy of the mesenteric glands. Hypertrophia glandularum mesenterii.

551. Non-malignant tumors of the mesenteric glands. Tumores non maligni glandularum mesenterii.

552. Tabes mesenterica. Tabes mesenterica. *Syn.* Marasmus.

DISEASES OF THE DUCTLESS GLANDS.
MORBI GLANDULARUM CÆCARUM.

DISEASES OF THE THYROID GLAND.
MORBI GLANDULÆ THYROIDIS.

553. Inflammation of the thyroid gland. Inflammatio glandulæ thyroidis.

a. Acute. Acuta.

b. Chronic. Chronica.

554. Goître. Bronchocele.

Enlargement of the thyroid gland, endemic in certain mountainous districts, but not limited to them.

555. Cyst of the thyroid gland. Cystis glandulæ thyroidis.

556. Exophthalmic goître. Bronchocele exophthalmica. *Syn.* Graves' disease.

Enlargement, with vascular turgescence, of the thyroid gland, accompanied by protrusion of the eyeballs, anæmia, and palpitation.

557. Pulsating goître. Bronchocele pulsans.

DISEASES OF THE THYMUS GLAND.
MORBI GLANDULÆ THYMI.

558. Hypertrophy of the thymus gland. Hypertrophia glandulæ thymi.

DISEASES OF THE SUPRA-RENAL CAPSULES.
MORBI CAPSULARUM SUPRARENALIUM.

559. Supra-renal cachexia. Cachexia suprarenalis. *Syn.* Addison's disease.

A disease with a disorganized condition of the supra-renal capsules, and a bronze-like discoloration of the skin.

DISEASES OF THE GENERATIVE ORGANS.
MORBI GENITALIUM.

DISEASES OF THE MALE GENITALS.
MORBI GENITALIUM VIRILIUM.

DISEASES OF THE PENIS.
MORBI COLIS.

560. Inflammation of the penis. Colis inflammatio.

561. Abscess of the penis. Colis abscessus.

562. Gangrene of the penis. Colis gangræna.

563. Warts of the penis. Colis verrucæ.

564. Venereal sores of the penis. Ulcera colis venerea.

a. Chancre. Ulcus venereum durum *sive* syphiliticum. *Syn.* Hard, syphilitic, or infecting chancre.

Syphilitic bubo. Inguen syphiliticum.*

b. Chancroid. Ulcus venereum molle. *Syn.* Soft or non-infecting chancre; Simple sore.

Chancroidal bubo. Inguen virulentum.*

c. Phagedænic sore. Ulcus phagedænicum.

d. Serpiginous sore. Ulcus serpiginosum. *Syn.* Creeping ulcer.

565. Phimosis. Phimosis.

566. Paraphimosis. Paraphimosis.

567. Hypertrophy of the prepuce. Præputii hypertrophia.

568. Cancer of the penis. Carcinoma colis.

569. Malformations of the penis. Deformitates colis congenitæ.

570. Priapism. Priapismus.

DISEASES OF THE SCROTUM.
MORBI SCROTI.

571. Inflammation of the scrotum. Scroti inflammatio.

572. Abscess of the scrotum. Scroti abscessus.

573. Gangrene of the scrotum. Scroti gangræna.

574. Elephantiasis of the scrotum. Scroti elephantiasis.

575. Epithelial cancer of the scrotum. Scroti carcinoma epitheliosum. *Syn.* Chimney-sweeper's cancer.

576. Malformations of the scrotum. Deformitates scroti congenitæ.

DISEASES OF THE SPERMATIC CORD.
MORBI FUNICULI SEMINALIS.

577. Hydrocele of the spermatic cord. Hydrocele funiculi seminalis.

a. Simple. Simplex.

b. Encysted. Cystica.

c. Diffused. Diffusa.

578. Varicocele of the spermatic cord. Cirsocele funiculi seminalis.

* See Diseases of the Absorbent Glands.

579. Tumors of the spermatic cord. Tumores funiculi seminalis.

580. Neuralgia of the spermatic cord. Neuralgia funiculi seminalis.

DISEASES OF THE TUNICA VAGINALIS.
MORBI TUNICÆ VAGINALIS.

581. Inflammation of the tunica vaginalis. Inflammatio tunicæ vaginalis.

582. Hydrocele. Hydrocele.

a. Congenital. Congenita.

b. Acquired. Non-congenita.

c. Encysted. Cystica. *Syn.* Spermatocele.

583. Hæmatocele. Hæmatocele.

584. Loose bodies in the tunica vaginalis. Corpora libera in tunicâ vaginali.

DISEASES OF THE TESTICLE.
MORBI TESTICULI.

585. Orchitis. Orchitis.

a. Acute. Acuta.

b. Chronic. Chronica. *Syn.* Simple sarcocele.

586. Epididymitis. Epididymitis. *Syn.* Swelled testicle.

587. Abscess of the testicle. Abscessus testiculi.

588. Protrusion of the tubuli of the testicle. Procidentia testiculi tubulorum. *Syn.* Hernia testis; Fungus testis.

589. Atrophy of the testicle. Atrophia testiculi.

590. Syphilitic disease of the testicle. Morbus testiculi syphiliticus. *Syn.* Syphilitic sarcocele.

591. Tuberculous disease of the testicle. Morbus testiculi tuberculosus. *Syn.* Tuberculous sarcocele.

592. Cancer of the testicle. Carcinoma testiculi. *Syn.* Malignant sarcocele.

593. Non-malignant tumors of the testicle. Tumores testiculi non maligni.

594. Cystic disease of the testicle. Morbus testiculi cysticus. *Syn.* Cystic sarcocele.

595. Malformations of the testicle. Deformitates testiculi congenitæ.

a. Dermoid cyst of the testicle. Cystis testiculi cutigera.

596. Malposition of the testicle. Positura testiculi prava.

597. Spermatorrhœa. Spermatorrhœa.

598. Impotence and sterility. Virilitatis inopia atque sterilitas.

599. Neuralgia of the testicle. Neuralgia testiculi.

DISEASES OF THE FEMALE ORGANS OF GENERATION IN THE UNIMPREGNATED STATE.

MORBI LOCORUM VIRGINALIUM.

DISEASES OF THE OVARY.

MORBI OVARII.

600. Ovaritis. Ovaritis.

601. Abscess of the ovary. Abscessus ovarii.

602. Hemorrhage of the ovary. Hæmorrhagia ovarii.

603. Atrophy of the ovary. Atrophia ovarii.

604. Hypertrophy of the ovary. Hypertrophia ovarii.

605. Cancer of the ovary. Carcinoma ovarii.

606. Fibrous tumor of the ovary. Tumor fibrosus ovarii.

607. Encysted dropsy of the ovary. Hydrops cysticus ovarii.

608. Complex cystic tumor of the ovary. Tumor cysticus multiplex ovarii. *Syn.* Cystosarcoma.

a. With intracystic growths. Innascente materiâ morbidâ.

609. Cutaneous or piliferous cyst of the ovary. Cystis cutigera, *sive* pilosa, ovarii. *Syn.* Dermoid cyst.

610. Dentigerous cyst of the ovary. Cystis dentigera ovarii.

611. Tubercle of the ovary. Tubercula ovarii.

612. Parasitic disease of the ovary. Morbus parasiticus ovarii.

613. Dislocation of the ovary. Ovarium luxatum.

a. Transplantation. Ovarium translatum.

614. Hernia of the ovary. Hernia ovarii.

615. Malformations of the ovary. Deformitates congenitæ ovarii.

DISEASES OF THE FALLOPIAN TUBE.

MORBI TUBI FALLOPIANI.

616. Abscess of the Fallopian tube. Abscessus tubi Fallopiani.

617. Dropsy of the Fallopian tube. Hydrops tubi Fallopiani.

618. Stricture of the Fallopian tube. Strictura tubi Fallopiani.

619. Occlusion of the Fallopian tube. Tubus Fallopiani occlusus.

620. Cancer of the Fallopian tube. Carcinoma tubi Fallopiani.

621. Cyst of the Fallopian tube. Cystis tubi Fallopiani.

622. Tubercle of the Fallopian tube. Tubercula tubi Fallopiani.

623. Dislocation of the Fallopian tube. Tubus Fallopianus luxatus.

624. Hernia of the Fallopian tube. Hernia tubi Fallopiani.

DISEASES OF THE BROAD LIGAMENT AND INTRA-PELVIC PERITONEUM.

MORBI LIGAMENTI LATI ET PERITONEI INTRA-PELVICI.

625. Inflammation. Inflammatio.

a. Pelvic peritonitis. Peritonitis pelvica. *Syn.* Perimetritis.

b. Pelvic cellulitis. Cellulitis pelvica. *Syn.* Phlegmona pelvica; Parametritis.

626. Abscess. Abscessus.

627. Cyst. Cystis.

628. Hydrocele of the round ligament. Hydrocele ligamenti teretis. *Syn.* Hydrocele of the canal of Nuck.

629. Peri-uterine or pelvic hæmatocele. Hæmatocele circum-uterina, *sive* pelvica.

DISEASES OF THE WOMB, INCLUDING ITS NECK.

MORBI UTERI, CERVICISQUE EJUS.

630. Catarrh of the uterus. Catarrhus uteri. *Syn.* Uterine leucorrhœa.

a. Hydrorrhea. Hydrorrhœa.

631. Physometra. Physometra.

632. Metritis. Metritis.

a. Parenchymatous inflammation of the body of the womb. Metritis corporea.

b. Inflammation of the lining membrane of the body of the womb. Endometritis corporea.

c. Cervicitis. Cervicitis.
Parenchymatous inflammation of the neck of the womb.

d. Endocervicitis. Endocervicitis.
Inflammation of the lining membrane of the neck of the womb.

633. Granular inflammation of the neck of the womb. Inflammatio granulosa cervicis uteri.

634. Abrasion of the cervix. Uteri cervix abrasa.

635. Ulcer of the cervix. Ulcus cervicis uteri.

636. Rodent ulcer of the cervix. Ulcus cervicis uteri erodens.

637. Abscess of the neck of the womb. Abscessus cervicis uteri.

638. Utero-vesical fistula. Fistula utero-vesicalis.

639. Stricture of the orifice of the neck of the womb. Strictura oris uteri.

640. Stricture of the canal of the neck of the womb. Strictura canalis cervicis uteri.

641. Occlusion of the orifice of the neck of the womb. Os cervicis uteri occlusum.

642. Occlusion of the canal of the neck of the womb. Canalis cervicis uteri occlusus.

643. Hypertrophy of the neck of the womb. Hypertrophia cervicis uteri.

a. Elongation of the cervix. Cervix uteri producta.

Of the supra-vaginal cervix. Cervix supra-vaginalis producta.

Of the intra-vaginal cervix. Cervix intra-vaginalis producta.

644. Atrophy of the womb. Atrophia uteri.

645. Cancer of the womb. Carcinoma uteri.

a. Scirrhus. Scirrhus.

b. Medullary cancer. Carcinoma medullosum.

c. Epithelial cancer. Carcinoma epitheliosum.

646. Non-malignant tumors of the womb. Tumores uteri non maligni.

a. Fibroid tumor. Tumor fibrosus. *Syn.* Myoma.

Subperitoneal. Subperitonealis.

Interstitial. Interstitialis.

Submucous. Submucosus.

b. Polypus. Polypus.

Note. — Under this head are included all pedunculated tumors growing from the cavity or neck of the uterus, whether mucous, cellular, or fibrous.

647. Tubercle of the womb. Tubercula uteri.

648. Displacements and distortions. Uterus luxatus vel distortus.
   a. Anteversion of the womb. Uteri anteversio.
   b. Retroversion of the womb. Uteri retroversio.
   c. Lateral version of the womb. Uteri lateroversio.
   d. Anteflexion of the womb. Uteri anteflexio.
   e. Retroflexion of the womb. Uteri retroflexio.
   f. Inversion of the womb. Uteri inversio.
   g. Falling of the womb. Uteri prolapsus.
   h. Protrusion of the womb. Procidentia uteri.
   i. Hernia of the womb. Hernia uteri.

649. Malformations of the womb. Deformitates uteri congenitæ.

DISEASES OF THE VAGINA.
MORBI VAGINÆ.

650. Vaginitis. Vaginitis.

651. Leucorrhœa. Leucorrhœa. *Syn.* Vaginal catarrh.

652. Abscess of the vagina. Abscessus vaginæ.

653. Cicatrix or band of the vagina. Cicatrix *sive* habenula vaginæ.

654. Vaginal fistula. Fistula in vaginâ.

655. Vesico-vaginal fistula. Fistula vesico-vaginalis.

656. Recto-vaginal fistula. Fistula recto-vaginalis.

657. Urethro-vaginal fistula. Fistula urethro-vaginalis.

658. Hernia of the vagina. Hernia vaginæ.
   a. Cystocele. Cystocele.
   b. Rectocele. Rectocele.

659. Tumors. Tumores.
   a. Polypus of the vagina. Polypus vaginæ.

660. Cyst of the vagina. Vaginæ cystis.

661. Laceration of the vagina. Laceratio vaginæ.

662. Malformations of the vagina. Deformitates vaginæ congenitæ

DISEASES OF THE VULVA.
MORBI VULVÆ.

663. Vulvitis. Vulvitis. *Syn.* Inflammation of the vulva.

664. Pruritus of the vulva. Pruritus vulvæ.

665. Œdema of the labia. Œdema labiorum.

666. Abscess of the labium. Abscessus labii.

667. Gangrene of the vulva. Gangræna vulvæ.

668. Hypertrophy of the vulva. Hypertrophia vulvæ.

669. Occlusion of the vulva. Foramen vulvæ occlusum. *Syn.* Atresia vulvæ.

670. Imperforate hymen. Membrana vulvæ impervia.

671. Vascular tumor of the meatus urinarius. Tumor vasculosus meatûs urinarii.

672. Mucous cyst of the vulva. Cystis mucosa vulvæ.

673. Malformations of the vulva. Deformitates vulvæ congenitæ.

FUNCTIONAL DISEASES OF THE FEMALE ORGANS OF GENERATION.

VITIA FUNCTIONUM LOCORUM VIRGINALIUM.

674. Amenorrhœa. Amenorrhœa.

a. From original defective formation. Ex defectione partium congenitâ.

b. From want of development at the time of puberty. Ex incrementi inopiâ.

c. From mechanical obstruction. Ex occlusione.

d. From temporary suppression. Ex suppressione.

675. Scanty menstruation. Menstrua exigua.

676. Vicarious menstruation. Menstrua vicaria.

677. Dysmenorrhœa. Dysmenorrhœa. *Syn.* Painful menstruation.

678. Menorrhagia. Menorrhagia. *Syn.* Excessive menstruation.

679. Hemorrhage. Metrorrhagia.

680. Chlorosis. Chlorosis. *Syn.* Green sickness; Pallor luteus.

AFFECTIONS CONNECTED WITH PREGNANCY.

MALA GRAVIDIS INCIDENTIA.

DISORDERS OF THE NERVOUS SYSTEM.

MALA NERVORUM APPARATUS.

681. Neuralgia. Neuralgia.

a. Odontalgia. Odontalgia.

b. Cephalalgia. Cephalalgia.

c. Mastodynia. Mastodynia.

682. Chorea. Chorea.

683. Convulsions. Convulsio.

684. Hypochondriasis. Hypochondriasis.

685. Mania. Mania.

DISORDERS OF THE BLOOD AND CIRCULATORY SYSTEM.
MALA SANGUINIS ET EJUS APPARATUS.

686. Varicose veins. Varices.
   - *a.* Of the lower extremities. Membrorum inferiorum.
   - *b.* Of the labia. Labiorum.
   - *c.* Of the rectum. Recti hæmorrhoides. Hæmorrhoids.

687. Serous effusion. Profusio seri.
   - *a.* Of the brain. Profusio in cerebro. *Syn.* Serous apoplexy.
   - *b.* Œdema of the lungs. Œdema pulmonum.
   - *c.* Ascites. Ascites.
   - *d.* Œdema of the labia. Œdema labiorum.
   - *e.* Œdema of the lower extremities. Œdema membrorum inferiorum.

688. Syncope. Syncope.

689. Palpitation. Palpitatio cordis.

690. Anæmia. Anæmia. *Syn.* Hydræmia.

691. Leucocythemia. Leucocythemia.

DISORDERS OF THE RESPIRATORY SYSTEM.
MALA RESPIRATIONIS APPARATUS.

692. Dyspnœa. Dyspnœa.

693. Orthopnœa. Orthopnœa.

694. Cough. Tussis.

DISORDERS OF THE DIGESTIVE SYSTEM.
MALA DIGESTIONIS APPARATUS.

695. Salivation. Salivatio.

696. Depraved and capricious appetite. Cupiditas cibi prava. *Syn.* Pica.

697. Nausea and vomiting. Nausea et vomitus.

698. Cardialgia. Cardialgia. *Syn.* Heartburn.

699. Pyrosis. Pyrosis.

700. Intestinal cramp-colic. Tormina.

701. Constipation. Alvus adstricta.

702. Diarrhœa. Diarrhœa.

703. Jaundice. Icterus.

DISORDERS OF THE URINARY SYSTEM.
MALA URINÆ APPARATUS.

704. Albuminuria. Albuminuria.

705. Dysuria. Dysuria.

706. Incontinence of urine. Incontinentia urinæ.

707. Retention of urine. Retentio urinæ.

DISORDERS OF THE GENERATIVE SYSTEM.
MALA GENITALIUM APPARATUS.

708. Metritis. Metritis. *Syn.* Hysteritis.

709. Hydrorrhœa of the womb. Hydrorrhœa uteri.
Discharge of watery fluid from the uterus.

710. Rheumatism of the uterus. Rheumatismus uteri.

711. Hysteralgia. Hysteralgia. *Syn.* Metralgia.

712. Cramps and spurious pains. Spasmi et dolores nothi.

713. Catarrh of the vagina. Catarrhus vaginæ.

714. Sanguineous discharge. Profluvium sanguineum.

715. Hemorrhage. Hæmorrhagia.

716. Displacements of the uterus. Uterus luxatus.

a. Prolapsus. Prolapsus.

b. Hernia. Hernia.

c. Retroversion. Retroversio.

717. Pruritus of the vulva. Pruritus vulvæ.

718. Warts of the vulva. Verrucæ vulvæ.

719. Abortion. Abortus.

720. Premature labor. Partus intempestivus.

721. Extra-uterine gestation. Extra uterum graviditas.

722. Uterine mole. Mola uterina.

723. Cystic disease of the chorion. Morbus cysticus chorii. *Syn.* Hydatid mole.

724. Diseases of the placenta. Morbi placentæ.

725. Inflammation of the placenta. Placentitis.

726. Degeneration of the placenta. Degeneratio placentæ.

a. Fatty degeneration. Degeneratio adiposa.

b. Calcareous degeneration. Degeneratio calcarea.

AFFECTIONS CONNECTED WITH PARTURITION.

MALA PARTURIENTIBUS INCIDENTIA.

727. Atony of the uterus. Resolutio uteri.

728. Over-distention of the uterus. Uterus supra modum distentus.

a. From excess of liquor amnii. Ex immodico liquore amnii.

b. From twins, triplets, etc. Ex geminis, trigeminis, etc.

729. Mechanical obstacles to parturition. Impedimenta partûs.

a. From occlusion of the os uteri. Ex oris uteri occlusione.

b. From rigidity. Ex rigiditate.

From rigidity of the os uteri. Ex oris uteri rigiditate.

From rigidity of the vagina. Ex vaginæ rigiditate.

From rigidity of the perineum. Ex perinei rigiditate.

c. From cancer of the cervix uteri. Ex carcinomate cervicis uteri.

d. From narrowness of the vagina. Ex vaginæ coarctatione.

e. From cicatrix or band in the vagina. Ex cicatrice vel habenulâ in vaginâ.

f. From vaginal cyst. Ex cyste vaginali.

g. From prolapsus of the bladder. Ex vesicæ prolapsû.

h. From stone in the bladder. Ex calculo vesicæ.

i. From distended rectum. Ex distentione recti intestini.

k. From prolapsus of the rectum. Ex recti intestini prolapsu.

l. From tumor. Ex tumore.

Uterine. Uteri.

Ovarian. Ovarii.

Pelvic. Pelvis.

Of external parts. Partium exteriorum.

m. From polypus. Ex polypo.

n. From fractured pelvis. Ex fracturâ pelvis.

o. From exostosis. Ex exostose.

p. From distorted or contracted pelvis. Ex distortione vel constrictione pelvis.

q. From dislocated lumbar vertebræ. Ex luxatione lumborum vertebrarum. *Syn.* Spondylolisthesis.

r. From anchylosed coccyx. Ex anchylose coccygis.

s. From diminutive pelvis. Ex pelve parvâ.

t. From extreme anteversion of the uterus (from pendulous abdomen). Ex abdomine pendenti.

u. From excessive size of the fœtus. Ex fœtû prægrandi.

v. From malposition of the fœtus. Ex fœtû male locato.

w. From malformation of the fœtus. Ex deformitate fœtûs.

x. From enlargement of the fœtus from disease. Ex fœtû morbo adaucto.

y. From thickness of the fœtal membranes. Ex crassitudine membranarum fœtûs.

z. From shortness of the funis. Ex brevitate funis.

730. Hemorrhage. Hæmorrhagia.

a. From placenta prævia. Ex placentâ prævia. *Syn.* Unavoidable hemorrhage.

b. From accidental detachment of the placenta. Ex placentâ casû separatâ. *Syn.* Accidental hemorrhage.

c. From thrombus of the cervix uteri or labium. Ex thrombo cervicis uteri vel labii.

731. Rupture or laceration of the uterus. Diruptio vel laceratio uteri.

732. Rupture or laceration of the vagina. Diruptio vel laceratio vaginæ.

733. Rupture or laceration of the urinary bladder. Diruptio vel laceratio vesicæ.

734. Rupture or laceration of the perineum. Diruptio vel laceratio perinei.

735. Retention of the afterbirth. Retentio secundarum. *Syn.* Retained placenta.

a. From atony of the uterus. Ex resolutione uteri.

b. From irregular or hour-glass contraction. Ex contracto sine ordine utero, vel ad similitudinem horologii.

c. From preternatural adhesion. Ex adhesû præter naturam secundarum.

736. Inversion of the uterus. Uteri inversio.

737. Convulsions. Convulsio. *Syn.* Eclampsia.

a. Apoplectic. Apoplectica.

b. Epileptic. Epileptica.

c. Hysterical. Hysterica.

AFFECTIONS CONSEQUENT ON PARTURITION.
MALA PUERPERIS INCIDENTIA.

738. Post-partum hemorrhage. Hæmorrhagia post partum.

739. Secondary hemorrhage. Hæmorrhagia prorogata.

740. Puerperal ephemera. Ephemera puerperarum. *Syn.* Weed.

741. Puerperal hyperæsthesia. Hyperæsthesia puerperarum.

742. Milk fever. Febris lactantium.

743. Puerperal fever. Febris puerperarum.

744. Metro-peritonitis. Metro-peritonitis. *Syn.* Puerperal peritonitis.

a. Metritis. Metritis.

b. Peritonitis. Peritonitis.

745. Phlebitis. Phlebitis.

746. Phlegmasia dolens. Phlegmasia dolens. *Syn.* Milk-leg.

747. Pelvic cellulitis. Parametritis.

748. Iliac and pelvic abscesses. Abscessus iliorum et pelvis.

749. Sloughing of the cervix uteri. Sphacelus cervicis uteri.

750. Sloughing of the vagina. Sphacelus vaginæ.

751. Sloughing of the perineum. Sphacelus perinei.

752. Sloughing of the bladder. Sphacelus vesicæ.

753. Sloughing of the rectum. Sphacelus recti intestini.

754. Utero-vesical fistula. Fistula utero vesicalis.

755. Vesico-vaginal fistula. Fistula vesico vaginalis.

756. Recto-vaginal fistula. Fistula recto vaginalis.

757. Inflammation of the female breast. Mammitis.

758. Abscess of the female breast. Abscessus mammæ.

759. Puerperal mania. Mania puerperarum.

a. Connected with parturition. A partû.

b. Connected with lactation. Lactantium.

760. Puerperal convulsions. Eclampsia.

761. Puerperal tetanus. Tetanus puerperarum. *Syn.* Tetany.

762. Sudden death after delivery. Mors repentina post partum.

a. From shock or nervous exhaustion. Ex concussu vel nervorum vi exinanitâ.

b. From impaction of coagula in the heart and pulmonary artery. Ex impactione coagulorum in corde arteriâque pulmonali.

Thrombosis. Thrombosis.

Embolism. Embolismus.

c. From entrance of air into the uterine sinuses. Ex introitû aëris in venas uterinas.

763. Premature birth. Partus intempestivus.

764. Sub-involution of the uterus. Uterus sub-involutus.

DISEASES OF THE FEMALE BREAST.
MORBI MAMMÆ FŒMINEÆ.

765. Mammitis. Mammitis. *Syn.* Inflammation of the breast.

a. Acute. Acuta.

b. Chronic. Chronica.

766. Abscess of the breast. Abscessus mammæ. *Syn.* Gathered breast.

767. Encysted abscess of the breast. Abscessus mammæ sacculatus.

768. Sinus of the breast. Sinus mammæ.

769. Fistula of the breast. Fistula mammæ. *Syn.* Milk-fistula.

770. Galactorrhœa. Galactorrhœa.

771. Deficiency of milk. Inopia lactis.

772. Milk-tumor. Galactocele.

773. Lacteal calculus. Calculus lacteus.

774. Hypertrophy of the breast. Hypertrophia mammæ.

775. Atrophy of the breast. Atrophia mammæ.

776. Depressed nipple. Papilla depressa.

777. Chapped nipple. Papilla scissa.

778. Ulcerated nipple. Papilla exulcerata.

779. Cancer of the breast. Carcinoma mammæ.

780. Non-malignant tumors of the breast. Tumores mammæ non maligni.

781. Cyst of the breast. Cystis mammæ.

a. Serous cyst of the breast. Cystis serosa mammæ. *Syn.* Sero-cystic tumor; Hydrocele of the breast.

b. Complex cystic tumor of the breast. Tumor cysticus multiplex mammæ. *Syn.* Sero-cystic sarcoma.

782. Parasitic disease of the breast. Morbus parasiticus mammæ.

783. Hyperæsthesia of the breast. Hyperæsthesia mammæ.

784. Mammalgia. Mammalgia. *Syn.* Neuralgia of the breast.

DISEASES OF THE MALE MAMMILLA.
MORBI MAMMILLÆ VIRILIS.

785. Inflammation of the male mammilla. Inflammatio mammillæ virilis.

786. Hypertrophy of the male mammilla. Hypertrophia mammillæ virilis.

787. Cancer of the male mammilla. Carcinoma mammillæ virilis.

788. Non-malignant tumors of the male mammilla. Tumores non maligni mammillæ virilis.

789. Cyst of the male mammilla. Cystis mammillæ virilis

DISEASES OF THE NERVOUS SYSTEM.
MORBI NERVORUM APPARATUS.

DISEASES OF THE BRAIN AND ITS MEMBRANES.
MORBI CEREBRI MEMBRANARUMQUE.

790. Encephalitis. Encephalitis.
Inflammation of the brain or of its membranes.

Note.—This term is to be used only when the precise seat of the inflammation has not been ascertained.

791. Meningitis. Meningitis.
Inflammation of the membranes of the brain.

a. Inflammation of the dura mater. Inflammatio duræ matris.

b. Ossification of the dura mater. Ossificatio duræ matris.

c. Arachnitis. Arachnitis.
Inflammation of the pia mater and arachnoid.

d. Tuberculous meningitis. Meningitis tuberculosa. *Syn.* Acute hydrocephalus.

792. Inflammation of the brain. Cerebritis.

793. Red softening of the brain. Cerebri mollities rubra.

794. Yellow softening of the brain. Cerebri mollities flava.

795. Abscess of the brain. Abscessus cerebri.

796. Congestion of the brain. Congestio cerebri.

797. Apoplexy. Apoplexia.

a. Serous apoplexy. Apoplexia serosa.

b. Sanguineous apoplexy. Apoplexia hæmorrhagica. *Syn.* Cerebral hemorrhage.

c. Meningeal apoplexy. Apoplexia meningealis.

798. Sun-stroke. Solis ictus.

799. Chronic hydrocephalus. Hydrocephalus chronicus.

800. Hypertrophy of the brain. Hypertrophia cerebri.

801. Atrophy of the brain. Atrophia cerebri.
Diminution of brain-substance without softening.

802. White softening of the brain. Cerebri mollities alba. *Syn.* Atrophic softening.

803. Syphilitic disease. Morbus syphiliticus.

804. Cancer. Carcinoma.

805. Fibrous tumor. Tumor fibrosus.

806. Osseous tumor. Tumor osseus.

807. Tubercle of the brain. Tubercula cerebri.

808. Parasitic disease. Morbus parasiticus.

809. Malformations. Deformitates congenitæ.

810. Diseases of the cerebral arteries. Morbi arteriarum cerebri.

a. Fatty degeneration. Degeneratio adiposa. *Syn.* Atheroma.

b. Calcareous degeneration. Degeneratio calcarea. *Syn.* Ossification.

c. Aneurism. Aneurysma.

d. Impaction of coagula. Coagula impacta. *Syn.* Thrombosis and Embolism.

DISEASES OF THE SPINAL CORD AND ITS MEMBRANES.

MORBI MEDULLÆ SPINALIS MEMBRANARUMQUE EJUS.

811. Spinal inflammation. Inflammatio spinalis.
Note.—This term is to be used only when the precise seat of the inflammation has not been ascertained.

812. Spinal meningitis. Meningitis spinalis.
Inflammation of the membranes of the spinal cord.

813. Myelitis. Myelitis.
Inflammation of the substance of the spinal cord.

814. Spinal hemorrhage. Hemorrhagia spinalis. *Syn.* Spinal apoplexy.

815. Spinal atrophy. Atrophia spinalis. *Syn.* Locomotor ataxy; Tabes dorsalis.

816. White softening of the spinal cord. Medullæ mollities alba.

817. Cancer. Carcinoma.

818. Non-malignant tumors. Tumores non maligni.

819. Malformations. Deformitates congenitæ.

820. Spinal dropsy. Hydrorachis.

DISEASES OF THE NERVES.

MORBI NERVORUM.

821. Neuritis. Neuritis.

822. Atrophy. Atrophia.

823. Cancer. Carcinoma.

824. Neuroma. Neuroma.

A tumor of innocent nature growing on or between the fasciculi of a nerve.

825. Paralysis. Paralysis.

a. General paralysis. Paralysis generalis. *Syn.* Paralysis of the insane.

b. Hemiplegia. Hemiplegia.

c. Paraplegia. Paraplegia.

d. Locomotor ataxy. Ataxia motûs.

e. Progressive muscular atrophy. Atrophia musculorum ingravescens.

f. Infantile paralysis. Paralysis infantilis.

g. Local paralysis. Paralysis localis.

h. Facial paralysis. Paralysis faciei.

i. Scrivener's paralysis. Paralysis notariorum.

k. Diphtheric paralysis. Paralysis diphtherica.

l. Lead palsy. Paralysis ex plumbo.

m. Paralysis from lathyrus. Paralysis ex lathyro.

FUNCTIONAL DISEASES OF THE NERVOUS SYSTEM.

MORBI APPARATUS NERVORUM ACTIONUM NATURALIUM.

826. Tetanus. Tetanus.

827. Hydrophobia. Hydrophobia.

828. Infantile convulsions. Convulsio infantilis.

829. Epilepsy. Epilepsia.

830. Convulsions. Convulsio.

831. Muscular spasm. Spasmus musculorum.

832. Laryngismus stridulus. Laryngismus stridulus. *Syn.* Spasm of the glottis; Child-crowing.

833. Shaking palsy. Paralysis agitans.

834. Chorea. Chorea. *Syn.* St. Vitus's dance.

a. Acute. Acuta.

b. Chronic. Chronica.

835. Hysteria. Hysteria.

836. Catalepsy. Catalepsia.

837. Neuralgia. Neuralgia.

Principal varieties.

a. Facial neuralgia. Neuralgia faciei. *Syn.* Tic douloureux.

b. Frontal neuralgia. Neuralgia frontis.

c. Hemicrania. Hemicrania.

d. Intercostal neuralgia. Neuralgia intercostalis.

e. Sciatica. Sciatica.

f. Irritable cicatrix. Cicatrix irritabilis.

838. Hyperæsthesia. Hyperæsthesia.

839. Anæsthesia. Anæsthesia.

840. Hypochondriasis. Hypochondriasis.

DISORDERS OF THE INTELLECT.
AFFECTUS MENTIS.

841. Mania. Mania.

a. Acute mania. Mania acuta.

b. Chronic mania. Mania chronica.

842. Melancholia. Melancholia.

843. Monomania. Monomania.

844. Dementia. Dementia.

a. Acute dementia. Dementia acuta.

b. Chronic dementia. Dementia chronica.

845. Idiocy. Amentia.

846. Imbecility. Imbecilitas.

DISEASES OF THE ORGANS OF THE SPECIAL SENSES.
MORBI SENSUUM SINGULARIUM APPARATUS.

DISEASES OF THE EYE.
MORBI OCULORUM.

DISEASES OF THE CONJUNCTIVA.
MORBI CONJUNCTIVÆ.

847. Conjunctivitis. Conjunctivitis. *Syn.* Ophthalmia.

848. Catarrhal conjunctivitis. Conjunctivitis cum catarrho.

849. Pustular conjunctivitis. Conjunctivitis pustulosa.

850. Purulent conjunctivitis. Conjunctivitis purulenta.

851. Purulent conjunctivitis of infants. Conjunctivitis infantium purulenta.

852. Scrofulous conjunctivitis. Conjunctivitis strumosa. *Syn.* Strumous ophthalmia.

853. Gonorrhœal conjunctivitis. Ophthalmia gonorrhöica.

854. Chronic conjunctivitis. Lippitudo. *Syn.* Blear-eye.

855. Granular lids. Trachoma.

856. Chemosis. Chemosis.

857. Pinguecula. Pinguecula.

858. Pterygium. Pterygium.

859. Fatty tumor of the conjunctiva. Tumor adiposus in conjunctivâ.

860. Parasitic disease of the conjunctiva. Morbus parasiticus in conjunctivâ.

861. Metallic stains of the conjunctiva. Maculæ metallicæ in conjunctivâ.

a. From nitrate of silver. Ex argenti nitrate.

b. From lead. Ex plumbo.

DISEASES OF THE CORNEA.
MORBI CORNEÆ.

862. Keratitis. Keratitis.

863. Chronic interstitial keratitis. Keratitis interior chronica.

864. Keratitis with suppuration. Keratitis suppurans. *Syn.* Onyx.

865. Ulcer of the cornea. Ulcus corneæ.

866. Opacity of the cornea. Cornea opaca. *Syn.* Leucoma; Albugo.

867. Conical cornea. Cornea cacuminata.

868. Hydrophthalmia. Hydrophthalmia.

869. Arcus senilis. Arcus senilis.

870. Staphyloma of the cornea. Staphyloma corneæ.

871. Parasitic disease in the anterior chamber of the eye. Morbus parasiticus cavi oculi citerioris.

DISEASES OF THE SCLEROTIC.
MORBI SCLEROTICÆ.

872. Sclerotitis. Sclerotitis.

873. Staphyloma of the sclerotica. Staphyloma scleroticæ.

DISEASES OF THE IRIS.
MORBI IRIDIS.

874. Iritis. Iritis.

875. Traumatic iritis. Iritis ex vulnere.

876. Rheumatic iritis. Iritis rheumatica.

877. Gouty iritis. Iritis arthritica.

878. Syphilitic iritis. Iritis syphilitica.

879. Scrofulous iritis. Iritis strumosa.

880. Gonorrhœal iritis. Iritis gonorrhöica.

881. Sequelæ of iritis. Consequentia ex iritide.

882. Prolapsus of the iris. Prolapsus iridis.

883. Malformations. Deformitates congenitæ.

DISEASES OF THE CHOROID AND RETINA.
MORBI CHOROIDIS ET RETINÆ.

884. Choroiditis. Choroiditis.

885. Retinitis. Retinitis.

886. Choroidal apoplexy. Apoplexia choroidea.

887. Embolism of the central artery of the retina. Embolismus arteriæ centralis retinæ.

888. Amaurosis. Amaurosis.

889. Impaired vision. Visus deterior.

890. Albinism. Albitudo.

DISEASES OF THE OPTIC NERVE.
MORBI NERVI OPTICI.

891. Optic neuritis. Neuritis optica.

892. Cupping of the optic papilla. Excavatio papillæ opticæ.

DISEASES OF THE VITREOUS BODY.
MORBI CORPORIS VITREI.

893. Synchysis. Synchysis.

894. Muscæ volitantes. Muscæ volitantes.

895. Various morbid deposits in the vitreous body. Deposita varia morbida in corpore vitreo.

DISEASES OF THE LENS AND ITS CAPSULE.
MORBI LENTIS CAPSULÆQUE EJUS.

896. Cataract. Suffusio.

a. Hard. Dura.

b. Soft. Mollis.

c. Fluid. Liquida.

897. Parasitic disease of the lens. Morbus lentis parasiticus.

898. Malformations of the lens. Deformitates lentis congenitæ.

a. Congenital cataract. Suffusio congenita.

899. Traumatic cataract. Suffusio ex vulnere.

GENERAL AFFECTIONS OF THE EYE.
AFFECTUS OCULI UNIVERSI.

900. Inflammation of the entire eyeball. Panophthalmitis.

901. Glaucoma. Glaucoma.

902. Sympathetic ophthalmia. Ophthalmia sympathetica.

903. Cancer of the eye. Carcinoma oculi.

904. Scrofulous deposit within the eyeball. Struma oculi interior.

905. Total disorganization of the eye from injury. Oculus funditus injuriâ convulsus.

906. Malformations. Deformitates congenitæ.

VARIOUS DEFECTS OF SIGHT.
DEFECTIONES VARIÆ VISUS.

907. Short sight. Myopia.

908. Long sight. Hypermetropia.

909. Faulty perception of colors. Dyschromatopsia. *Syn.* Color-blindness.

910. Hemeralopia. Hemeralopia. *Syn.* Night-blindness.

911. Nyctalopia. Nyctalopia. *Syn.* Day-blindness.

912. Astigmatism. Astigmatismus.

DISEASES OF THE LACHRYMAL APPARATUS.
MORBI LACHRYMARUM APPARATUS.

913. Lachrymal obstruction. Obstructio lachrymalis.

914. Abscess and fistula of the lachrymal sac. Abscessus et fistula sacci lachrymalis.

915. Dacryolites. Dacryolithi.

916. Diseases of the lachrymal gland and ducts. Morbi glandulæ lachrymalis et ductuum ejus.

DISEASES OF THE EYELIDS.
MORBI PALPEBRARUM.

917. Inflammation of the eyelids. Inflammatio palpebrarum.

918. Stye. Hordeolum.

919. Abscess in the Meibomian glands. Abscessus glandularum Meibomianarum.

920. Epicanthis. Epicanthis.

921. Entropium. Entropion.

922. Ectropium. Ectropion.

923. Trichiasis. Trichiasis.

924. Distichiasis. Distichiasis.

925. Madarosis. Madarosis. *Syn.* Loss of the eyelashes.

926. Tarsal ophthalmia. Ophthalmia tarsi.

927. Blepharospasm. Blepharospasmus.

928. Ptosis. Ptosis.

929. Hare-eye. Lagophthalmus.

930. Symblepharon. Symblepharon.

931. Anchyloblepharon. Anchyloblepharon.

932. Cyst of the eyelids. Cystis palpebrarum.

933. Tumors of the eyelids. Tumores palpebrarum.

934. Rodent ulcer of the eyelids. Ulcus erodens palpebrarum. *Syn.* Jacob's ulcer.

935. Malformations of the eyelids. Deformitates palpebrarum congenitæ.

DISEASES WITHIN THE ORBITS.
MORBI PARTIUM INTRA ORBITAS SITARUM.

936. Abscess in the orbit. Abscessus orbitæ.

937. Strabismus. Strabismus.

938. Protrusion of the eyeball. Procidentia oculi. *Syn.* Exophthalmos.

939. Tumors in the orbit. Tumores orbitæ.

940. Parasitic disease in the orbit. Morbus parasiticus orbitæ.

941. Affections of the orbital nerves. Affectus nervorum orbitæ.

DISEASES OF THE EAR.
MORBI AURIS.

DISEASES OF THE AURICLE.
MORBI AURICULÆ.

942. Gouty deposits in the auricle. Deposita in auriculâ ex podagrâ.

943. Hæmatoma auris. Hæmatoma auris.

944. Tumors of the auricle. Tumores auriculæ.

945. Malformations of the auricle. Deformitates auriculæ congenitæ.

DISEASES OF THE EXTERNAL MEATUS.
MORBI MEATUS EXTERNI.

946. Otitis. Otitis. *Syn.* Inflammation of the meatus.

947. Otorrhœa. Otorrhœa.

948. Abscess of the meatus. Meatûs abscessus.

949. Accumulation of wax in the meatus. Ceruminis in meatû accretio.

950. Aural polypus. Polypus auris.

951. Tumors of the meatus. Tumores meatûs.

952. Parasitic disease of the meatus. Morbus meatûs parasiticus.

953. Malformations of the meatus. Deformitates meatûs congenitæ

DISEASES OF THE MEMBRANA TYMPANI.
MORBI MEMBRANÆ TYMPANI.

954. Myringitis. Myringitis.

955. Ulceration of the membrana tympani. Membranæ tympani exulceratio.

956. Perforation of the membrana tympani. Membrana tympani perforata.

957. Calcareous deposits in the membrana tympani. Deposita calcarea in membranâ tympani.

DISEASES OF THE EUSTACHIAN TUBE AND TYMPANUM.
MORBI TUBI EUSTACHIANI ET TYMPANI.

958. Obstruction of the Eustachian tube. Tubi Eustachiani obstructio.

959. Disease of the mucous membrane of the tympanum. Morbi membranæ tympani mucosæ.

960. Disease of the ossicles. Morbi ossiculorum.

961. Disease of the mastoid cells. Morbi cellarum mastoidearum.

DISEASES OF THE INTERNAL EAR.
MORBI AURIS INTERIORIS.

962. Organic disease of the internal ear. Morbus auris interioris inhærens.

963. Necrosis of the petrous bone. Ossis petrosi necrosis.

964. Deafness. Surditas.

a. Functional or nervous. Naturalium actionum vel nervorum vitio.

b. From organic disease. Ex morbo inhærente.

c. Deaf-dumbness. Mutorum.

965. Malformations of the internal ear. Deformitates auris interioris congenitæ.

DISEASES OF THE NOSE.
MORBI NASI.

966. Hypertrophy of the nose. Hypertrophia nasi. *Syn.* Lipoma.

967. Wart of the nose. Verruca nasi.

968. Sebaceous cyst of the nose. Cystis nasi sebacea.

969. Epistaxis. Epistaxis.

970. Coryza. Coryza.

971. Ozæna. Ozæna.

972. Ulceration of the Schneiderian membrane. Membranæ Schneiderianæ exulceratio.

973. Abscess of the nasal septum. Abscessus septi nasi.

974. Perforation of the nasal septum. Septum nasi perforatum.

975. Hypertrophy of the Schneiderian membrane. Membranæ Schneiderianæ hypertrophia.

976. Nasal polypus. Polypus nasi.

a. Soft or gelatinous. Mollis *sive* glutinosus.

b. Hard or fibrous. Durus *sive* fibrosus.

977. Naso-pharyngeal polypus. Polypus nasi et pharyngis.

978. Tumors of the nasal septum. Septi nasi tumores.

979. Cancer of the nostril. Carcinoma naris. *Syn.* Malignant polypus.

980. Rhinolites. Rhinolithi. *Syn.* Nasal calculi.

981. Malformations of the nose. Deformitates nasi congenitæ.

982. Loss or perversion of the sense of smell. Anosmia vel odoratus perversus.

DISEASES OF THE ORGANS OF LOCOMOTION.
MORBI ORGANORUM CORPUS MOVENTIUM.

DISEASES OF BONES.
MORBI OSSIUM.

NOTE.—*In all cases the bones affected must be specified.*

983. Periostitis. Periostitis.

a. Nodes. Nodi.

984. Diffuse periostitis. Periostitis diffusa. *Syn.* Acute sub-periosteal abscess.

a. Acute necrosis. Necrosis acuta.

985. Ostitis. Ostitis.

986. Osteomyelitis. Osteomyelitis.

a. Simple. Simplex.

b. Suppurative. Suppurans.

c. Gangrenous. Gangrænosa.

987. Chronic abscess of bone. Abscessus ossis chronicus.

988. Caries. Caries.

989. Necrosis. Necrosis.

a. Dry. Sicca.

b. Moist. Humida. *Syn.* Mephitic gangrene of bone.

990. Mollities ossium. Mollities ossium. *Syn.* Osteomalacia.

990*a.* Fragility of the bones. Fragilitas ossium. *Syn.* Sathyrosis.

991. Hypertrophy of the bones. Hypertrophia ossium.

992. Atrophy of the bones. Atrophia ossium.

993. Spontaneous fracture. (The cause, if known, should be stated.) Fractura sponte orta.

994. Syphilitic disease of the bones. Morbus ossium syphiliticus.

995. Cancer of the bones. Carcinoma ossium.

996. Non-malignant tumors of the bones. Tumores ossium non maligni.

997. Cyst of bone. Cystis ossis.

998. Rickets. Rachitis.

999. Tubercle of the bones. Tubercula ossium.

1000. Osteoid aneurism. Aneurysma osteoides.

1001. Parasitic disease of bone. Morbus ossium parasiticus.

1002. Malformations of the bones. Deformitates congenitæ ossium.

DISEASES OF JOINTS.

MORBI ARTICULORUM.

NOTE.—*In all cases the joint affected is to be specified.*

1003. Synovitis. Synovitis.

a. Acute. Acuta.

b. Chronic. Chronica.

1004. Arthritis. Arthritis.
Inflammation involving all the structures of a joint.

1005. Gelatinous arthritis. Arthritis gelatinosa. *Syn.* Scrofulous or strumous synovitis.
Arthritis accompanied by gelatiniform or pulpy degeneration of the synovial membrane.

1006. Ulceration of cartilages. Exulceratio cartilaginum.

1007. Abscess of a joint. Abscessus articuli. *Syn.* Pyarthrosis.

1008. Ankylosis. Ankylosis.

a. Deformity from ankylosis. Deformitas ex ankylose.

1009. Dropsy of the joints. Hydrops articulorum.

1010. Gonorrhœal rheumatism. Rheumatismus gonorrhöicus.

1011. Chronic osteo-arthritis. Osteo-arthritis chronica. *Syn.* Rheumatoid arthritis.

1012. Degeneration of cartilage, and of the articular surfaces of bones. Degeneratio cartilaginis et summorum ossium articularium.

1013. Perforation of joints. Articuli perforati.

1014. Loose cartilage. Cartilago libera. *Syn.* Loose body in a joint.

1015. Relaxation of the ligaments of a joint. Resolutio articuli ligamentorum.

1016. Dislocation of the semilunar cartilages. Cartilaginum semilunarium luxatio.

1017. Knock-knee. Genua introrsum flexa.

1018. Bow-leg, or out-knee. Genua arcuata.

1019. Tumors of the joints. Tumores articulorum.

1020. Neuralgia of a joint. Neuralgia articuli. *Syn.* Hysterical joint.

DISEASES OF THE SPINE.

MORBI SPINÆ.

1021. Ulceration of ligaments and cartilages of the spine. Exulceratio ligamentorum et cartilaginum spinæ.

1022. Caries and necrosis of the vertebræ. Caries et necrosis vertebrarum.

a. Spontaneous fracture of the odontoid process. Fractura sponte orta processûs odontoïdis.

1023. Psoas, lumbar, and other abscesses. Abscessus psoadici, lumbares, aliique.

1024. Angular deformity of the spine. Deformitas angularis spinæ. *Syn.* Cyphosis.

1025. Lateral curvature of the spine. Curvatura ex transverso spinæ. *Syn.* Scoliosis.

1026. Anterior curvature of the spine. Curvatura in frontem spinæ. *Syn.* Lordosis.

1027. Rickety curvature of the spine. Curvatura spinæ rachitica.

1028. Ankylosis of the spine. Ankylosis spinæ.

1029. Chronic osteo-arthritis of the spine. Osteo-arthritis spinæ chronica.

1030. Non-malignant tumors of the spine. Tumores spinæ non maligni.

1031. Cancer of the spine. Carcinoma spinæ.

1032. Parasitic disease of the spine. Morbus spinæ parasiticus.

1033. Malformations of the spine. Deformitates spinæ congenitæ.

a. Spina bifida. Spina bifida.

DISEASES OF THE MUSCULAR SYSTEM.
MORBI MUSCULORUM APPARATUS.

NOTE.—*In all cases the affected muscle or muscles should be named.*

DISEASES OF THE MUSCLES.
MORBI MUSCULORUM.

1034. Myositis. Myositis. *Syn.* Inflammation of muscle.

1035. Abscess of the muscles. Abscessus musculorum.

1036. Gangrene of the muscles. Gangræna musculorum.

1037. Atrophy of the muscles. Atrophia musculorum.

1038. Progressive muscular atrophy. Atrophia musculorum ingravescens.

1039. Fatty degeneration of the muscles. Degeneratio musculorum adiposa.

1040. Ossification of the muscles. Ossificatio musculorum.

1041. Syphilitic disease of the muscles. Morbus musculorum syphiliticus.

1042. Cancer of the muscles. Carcinoma musculorum.

1043. Non-malignant tumors of the muscles. Tumores non maligni musculorum.

1044. Cyst of the muscles. Cystis musculorum.

1045. Infantile paralysis. Paralysis infantilis.

1046. Parasitic disease of the muscles. Morbus parasiticus musculorum.

a. Trichinosis. Trichinosis.

1047. Spasm of the muscles. Spasmus musculorum.

1048. Exhaustion of the muscles. Exinanitio virium musculorum.

1049. Scrivener's palsy. Paralysis notariorum.

1050. Diphtheric paralysis. Paralysis diphtherica.

DISEASES OF TENDONS.

MORBI TENDINUM.

1051. Inflammation of a tendon and its sheath. Teno-synovitis. *Syn.* Thecitis.

1052. Thecal abscess. Abscessus thecarum.

1053. Adhesion of tendons. Tendo adhærens.

1054. Tumors of tendons. Tumores tendinum.

1055. Ganglion. Ganglion.

a. Diffused palmar ganglion. Ganglion palmare diffusum.

1056. Contraction of tendons, fasciæ, or muscles. Contractio tendinum, fasciarum, aut musculorum.

1057. Club-foot. Talipes.

a. Talipes varus. Talipes varus.

b. Talipes valgus. Talipes valgus.

c. Talipes equinus. Talipes equinus.

d. Talipes calcaneus. Talipes calcaneus.

e. Talipes calcaneo-varus. Talipes calcaneo-varus.

f. Talipes equino-valgus. Talipes equino-valgus. *Syn.* Flat-foot; Splay-foot.

1058. Club-hand. Manus curta.

1059. Contracted palmar fascia. Arcus palmaris contractus.

1060. Wry-neck. Torticollis.

DISEASES OF BURSÆ.

MORBI BYRSARUM.

1061. Enlarged bursa patellæ. Byrsa patellæ amplificata. *Syn.* House-maid's knee.

1062. Enlargement of other bursas (specify which). Byrsarum aliarum amplificatio.

1063. Bursal tumor. Tumor byrsæ.

A solid tumor, the result of old enlargement of a bursa.

1064. Bursal abscess. Abscessus byrsæ.

1065. Bunion. Bunion.

INJURIES.

INJURIÆ.

GENERAL INJURIES.

INJURIÆ IN CORPORE UNIVERSO.

1066. Burns and scalds (including explosions). Ambusta.

1067. Lightning stroke. Fulminis ictus.

1068. Multiple injury. (The cause and extent to be stated.) Injuria multiplex.

1069. Apnœa. Apnœa. *Syn.* Asphyxia.

a. From drowning. Ex submersione.

b. From hanging. Ex suspendio.

c. From strangling. Ex strangulatione.

d. From obstruction of air-passages. Ex obturatis spiritus itineribus.

e. From overlying. Ex corpore superincubante.

f. From crushing. Ex compressu.

g. From gaseous poisons. Ex vaporibus pestiferis.

1070. Privation. Fames. *Syn.* Starvation.

1071. Exposure to cold. Frigus.

1072. Infant exposure. Infantium expositio.

1073. Neglect. Incuria.

LOCAL INJURIES.

INJURIÆ SINGULARES.

NOTE.—*In all cases of injury, specify whether accidental, judicial, homicidal, self-inflicted, or received in battle, and, in cases of wound, specify the weapon.*

INJURIES OF THE HEAD AND FACE.

INJURIÆ IN CAPITE ET FACIE.

A.—OF THE HEAD.

A.—IN CAPITE.

1074. Contusion of the head. Contusum in capite.

a. Cephalæmatoma. Cephalæmatoma.

1075. Scalp-wound: bone not exposed. Vulnus capitis cutis, osse non nudato.

1076. Scalp-wound: bone exposed. Vulnus capitis cutis, osse nudato.

1077. Concussion of the brain. Concussio cerebri.

1078. Fracture of the vault of the skull. Fractura calvariæ superioris.

a. Simple, without depression. Simplex, osse non depresso.

b. Simple, with depression. Simplex, osse depresso.

c. Compound, without depression. Foras patens, osse non depresso.

d. Compound, with depression. Foras patens, osse depresso.

1079. Hernia cerebri. Hernia cerebri. *Syn.* Fungus cerebri.

1080. Fracture of the base of the skull. Fractura basis calvariæ.

1081. Wound of the skull. Vulnus calvariæ.

1082. Laceration of the brain without fracture of the skull. Laceratio cerebri sine fractura calvariæ.

1083. Injuries of the cerebral vessels. (Specify which.) Injuriæ vasis cerebri illatæ.

1084. Injuries of the cerebral nerves. Injuriæ nervis cerebri illatæ.

B.—OF THE FACE.

B.—IN FACIE.

1085. Contusion of the face. Contusum in facie.

1086. Wound of the face. Vulnus in facie.

1087. Injuries of the vessels of the face. (Specify which.) Injuriæ vasis faciei illatæ.

1088. Foreign bodies in the ear. Corpora adventitia in aure sita.

1089. Foreign bodies in the nose. Corpora adventitia in naribus sita.

1090. Foreign bodies in the antrum. Corpora adventitia in antro sita.

1091. Foreign bodies in the soft parts. Corpora adventitia in partibus mollibus sita.

1092. Fracture of the facial bones. Fractura ossium faciei.

1093. Fracture of the lower jaw. Fractura maxillæ inferioris.

1094. Dislocation of the jaw. Maxillæ luxatio.

1095. Injuries of the teeth and alveoli. Injuriæ dentibus alveolisque illatæ.

INJURIES OF THE EYE.

INJURIÆ IN OCULO.

1096. Contusion of the eye. Oculus contusus.

1097. Contusion of the eye, with rupture of the sclerotic. Contusus oculus, ruptâ sclerotică. *Syn.* Ruptured globe.

1098. Contusion of the eye, with dislocation of the lens. Contusus oculus, lente luxata.

1099. Contusion of the eye, with hemorrhage into the globe. Contusus oculus, cum hæmorrhagiâ interiore.

1100. Foreign bodies in the cornea or conjunctiva. Corpora adventitia in corneam vel conjunctivam recepta.

1101. Foreign bodies in the cavity of the eye. Corpora adventitia intra oculum recepta.

1102. Wound of the eyelids. Vulnus palpebrarum.

1103. Wound of the conjunctiva. Vulnus conjunctivæ.

1104. Wound of the sclerotic. Vulnus scleroticæ.

1105. Wound of the cornea. Vulnus corneæ.

1106. Wound of the lens. Vulnus lentis.

1107. Wound of the iris. Vulnus iridis.

1108. Dislocation of the globe of the eye. Luxatio oculi.

1109. Wounds and injuries of the parts within the orbit. Vulnera vel injuriæ intra orbitam acceptæ.

1110. Chemical injuries of the eyelids and eye. Injuriæ chemicæ palpebris et oculo illatæ.

1111. Burns and scalds of the eye. Ambusta in oculo.

INJURIES OF THE NECK.

INJURIÆ IN CERVICE.

1112. Contusion of the soft parts of the neck. Contusum in cervicis partibus mollibus.

1113. Fracture of the hyoid bone. Fractura ossis hyoïdis.

1114. Fracture of the cartilages of the larynx. Fractura cartilaginum laryngis.

1115. Rupture of the trachea. Diruptio tracheæ.

1116. Dislocation of the hyoid bone. Ossis hyoïdis luxatio.

1117. Wound of the neck. Vulnus in cervice.

a. Superficial. Non-penetrans.

b. Penetrating. Penetrans. *Syn.* Cut-throat.

c. Gunshot. Sclopeticum.

d. From the mouth. Ex ore.

1118. Injuries of the cervical vessels. (Specify which.) Injuriæ vasis cervicis illatæ.

1119. Burn or scald of the larynx. Ambusta in larynge.

1120. Foreign bodies in the air-passages. Corpora adventitia in spiritûs itineribus.

1121. Foreign bodies in the pharynx. Corpora adventitia in pharynge.

1122. Foreign bodies in the œsophagus. Corpora adventitia in œsophago.

1123. Injury of the pharynx and œsophagus by corrosive substances. Injuria exedentium in pharynge et œsophago.

INJURIES OF THE CHEST.
INJURIÆ IN THORACE.

1124. Contusion of the chest. Contusum in thorace.

1125. Fracture of the ribs or costal cartilages without injury to the lung. Fractura costarum vel cartilaginum costalium illæso pulmone.

1126. Fracture of the ribs or costal cartilages with injury to lung. Fractura costarum vel cartilaginum costalium læso pulmone.

1127. Fracture of the sternum. Fractura sterni.

1128. Wound of the thoracic parietes. Vulnus laterum thoracis.

1129. Perforating wound of the chest. Vulnus perforans thoracis.

1130. Penetrating wound of the pleura or lung. Vulnus penetrans pleuræ vel pulmonis.

1131. Wound of the anterior mediastinum. Vulnus mediastini prioris.

1132. Wound of the pericardium and heart. Vulnus pericardii et cordis.

1133. Injuries of thoracic vessels. (Specify which.) Injuriæ vasis thoracis illatæ.

1134. Rupture of the heart or lung without wound or fracture. Diruptio cordis vel pulmonis citra vulnus aut fracturam.

INJURIES OF THE BACK.
INJURIÆ A TERGO.

1135. Contusion of the back. Contusum à tergo.

1136. Sprain of the back. Stremma à tergo.

1137. Wound of the back. Vulnus à tergo.

1138. Fracture and dislocation of the spine. Spina fracta et luxata.

1139. Injury of the spinal cord without known fracture. Injuria in medullâ spinali sine cognitâ fracturâ.

INJURIES OF THE ABDOMEN.

INJURIÆ IN VENTRE.

1140. Contusion of the abdomen. Contusum in ventre.

1141. Contusion of the abdomen with rupture of muscles. Contusum in ventre ruptis musculis.

1142. Contusion of the abdomen with rupture of viscera. Contusum in ventre ruptis visceribus.

1143. Wound of the abdominal parietes. Vulnus abdominis.

1144. Wound of the abdominal parietes with protrusion of uninjured viscera. Vulnus abdominis cum prolapsione viscerum illæsorum.

1145. Wound of the abdominal parietes with protrusion of wounded viscera. Vulnus abdominis cum prolapsione viscerum læsorum.

1146. Wound of the abdominal parietes with wound of unprotruded viscera. Vulnus abdominis cum vulnere viscerum in sede manentium.

1147. Wound of abdominal viscera without wound of parietes. Vulnus viscerum sine abdominis vulnere.

1148. Injuries of abdominal vessels. (Specify which.) Injuriæ vasis ventris illatæ.

1149. Foreign bodies in the peritoneal cavity. Corpora adventitia in peritonæo sita.

1150. Foreign bodies in the stomach. Corpora adventitia in ventriculo sita.

1151. Foreign bodies or concretions in the intestine. Corpora adventitia vel concreta in intestinis sita.

1152. Abdominal fistula from injury, and artificial anus. Fistula abdominis ex injuria, anusque nothus.

INJURIES OF THE PELVIS.

INJURIÆ IN PELVI.

1153. Contusion of the pelvis. Contusum in pelvi.

1154. Wound of the male perineum, scrotum, and penis. Vulnus perinei masculi, scroti, colisque.

1155. Wound of the female perineum and vulva. Vulnus perinei fœminei vulvæque.

1156. Wound of the vagina and internal female organs. Vulnus vaginæ partiumque interiorum in fœminis.

1157. Wound of the rectum. Vulnus recti intestini.

1158. Wound of the anus. Vulnus ani.

1159. Wound of the bladder. Vulnus vesicæ.

1160. Rupture of the bladder without external wound. Diruptio vesicæ sine vulnere aperto.

1161. Rupture of the bladder from fracture. Diruptio vesicæ ex fractura.

1162. Injuries of the pregnant uterus. Injuriæ utero gravido illatæ.

1163. Injuries of the pelvic vessels. (Specify which.) Injuriæ vasis pelvis illatæ.

1164. Foreign bodies in the vagina. Corpora adventitia in vaginâ sita.

1165. Foreign bodies in the rectum. Corpora adventitia in recto intestino sita.

1166. Foreign bodies in the bladder and urethra. Corpora adventitia in vesicâ et urethrâ sita.

1167. Fracture or dislocation of the pelvis. Fractura vel luxatio pelvis.

1168. Fracture or dislocation of the pelvis, with rupture of the bladder or urethra. Fractura vel luxatio pelvis, cum diruptione vesicæ vel urethræ.

INJURIES OF THE UPPER EXTREMITIES.

INJURIÆ IN MEMBRIS SUPERIORIBUS.

NOTE.—*The particular part affected is to be specified.*

1169. Contusion. Contusum.

1170. Sprain. Stremma.

1171. Wound. Vulnus.

1172. Wounds of joints. Vulnera articulorum.

1173. Injuries of vessels. Injuriæ vasis illatæ.

1174. Foreign bodies imbedded. Corpora adventitia inhærentia.

1175. Separation of epiphyses. Diductio epiphysium.

1176. Greenstick fracture, or bending of bone. Fractura surcularia, *sive* flexura ossis.

1177. Fracture. Fractura.

a. Simple. Simplex.

b. Compound. Foras patens.

Fracture of the clavicle. Fractura claviculæ.

Fracture of the scapula. Fractura scapulæ.

Fracture of the humerus. Fractura humeri.

Fracture of the radius and ulna. Fractura radii et ulnæ.

Fracture of the carpus, metacarpus, and phalanges. Fractura carpi, metacarpi, phalangiumque.

1178. Ununited fracture, or false joint. Fractura non coiens, *sive* articulus nothus.

1179. Dislocation. Luxatio.

a. Simple. Simplex.

b. Compound. Foras patens.

Dislocation of the sterno-clavicular joint. Luxatio claviculæ a parte sterni.

Dislocation of the acromio-clavicular joint. Luxatio claviculæ a parte scapulæ.

Dislocation of the shoulder. Luxatio humeri.

Dislocation of the elbow. Luxatio cubiti.

Dislocation of the wrist or carpus. Luxatio carpi.

Dislocation of the thumb. Luxatio pollicis.

Dislocation of the phalanges. Luxatio phalangium.

INJURIES OF THE LOWER EXTREMITIES.

INJURIÆ IN MEMBRIS INFERIORIBUS.

NOTE.—*The particular part affected is to be specified.*

1180. Contusion. Contusum.

1181. Sprain. Stremma.

1182. Wound. Vulnus.

1183. Wounds of joints. Vulnera articulorum.

1184. Injuries of vessels. Injuriæ vasis illatæ.

1185. Foreign bodies imbedded. Corpora adventitia inhærentia.

1186. Separation of epiphyses. Diductio epiphysium.

1187. Fracture. Fractura.

a. Simple. Simplex.

b. Compound. Foras patens.

Fracture of the femur. Fractura femoris.

Fracture of the cervix femoris. Fractura cervicis femoris.

a. Intracapsular. Intra capsulam.

b. Extracapsular. Extra capsulam.

Fracture of the great trochanter. Fractura processûs majoris.

Fracture of the patella. Fractura patellæ.

Fracture of the tibia and fibula. Fractura tibiæ et fibulæ.

Fracture of the bones of the foot. Fractura ossium pedis.

Ununited fracture, or false joint. Fractura non coiens, *sive* articulus nothus.

1188. Dislocation. Luxatio.

a. Simple. Simplex.

b. Compound. Foras patens.

Dislocation of the hip. Luxatio femoris.

Dislocation of the patella. Luxatio patellæ.

Dislocation of the knee. Luxatio genu.

Dislocation of the head of fibula. Luxatio fibulæ capitis.

Dislocation of the foot (at the ankle). Luxatio pedis.

Dislocation of the foot at calcaneo-astragaloid and scapho-astragaloid joints. Luxatio pedis inter calcaneum et astragalum et inter os scaphoides et astragalum.

Dislocation of the astragalus. Luxatio astragali.

Dislocation of the calcaneum. Luxatio calcanei.

Dislocation of the other tarsal bones. Luxatio cæterum tarsi ossium.

Dislocation of the metatarsus and phalanges. Luxatio metatarsi et phalangium.

INJURIES OF THE ABSORBENT SYSTEM.

INJURIÆ IN ORGANIS ABSORBENTIBUS.

1189. Foreign bodies or concretions. Corpora adventitia vel concreta.

1190. Wound of lymphatics. Vulnus vasorum lymphiferorum.

INJURIES NOT CLASSIFIED.

INJURIÆ NON IN CLASSES DISTRIBUTÆ.

1191. Rupture of muscles. Diruptio musculorum.

1192. Rupture of tendons. Diruptio tendinum.

1193. Foreign substances in the cellular tissue. Corpora adventitia in membranâ cellulosâ.

CONDITIONS NOT NECESSARILY ASSOCIATED WITH GENERAL OR LOCAL DISEASES.

CONDITIONES NON EX NECESSITATE CUM MORBIS CONJUNCTÆ SIVE CORPORIS UNIVERSI SIVE PARTIUM SINGULARUM.

1194. Still-born. Partus emortuus.

1195. Premature birth. Partus intempestivus.

1196. Old age. Senectus.

1197. Debility. Debilitas.

POISONS.

VENENA.

METALS AND THEIR SALTS.

METALLA ET SALES METALLICI.

1198. Arsenic. Arsenicum.

1199. Mercury. Hydrargyrum.

1200. Lead. Plumbum.

1201. Copper. Cuprum.

1202. Antimony. Antimonium.

1203. Zinc. Zincum.

1204. Silver. Argentum.

1205. Iron. Ferrum.

1206. Bismuth. Bismuthum.

1207. Chrome. Chromium.

1208. Cyanide of potassium. Potassii cyanidum.

CAUSTIC ALKALIES.

ALCALIA CAUSTICA.

1209. Potash. Potassa.

1210. Soda. Soda.

1211. Ammonia. Ammonia.

1212. Alkaline salts. Sales alcalini.

METALLOIDS.

METALLOIDEA.

1213. Phosphorus. Phosphorus.

1214. Iodine. Iodinium.

ACIDS.

ACIDA.

1215. Sulphuric acid. Acidum sulphuricum.

1216. Nitric acid. Acidum nitricum.

1217. Muriatic acid. Acidum muriaticum.

1218. Phosphoric acid. Acidum phosphoricum.

1219. Oxalic acid. Acidum oxalicum.

1220. Tartaric acid. Acidum tartaricum.

VEGETABLE POISONS.

VENENA VEGETABILIA.

1221. Savin. Sabina.

1222. Croton oil. Oleum tiglii.

1223. Elaterium. Elaterium.

1224. Colchicum. Colchicum.

1225. Black hellebore. Helleborus niger.

1226. White hellebore. Veratrum album.

1226*a*. Green hellebore. Veratrum viride.

a. Veratria. Veratria.

1227. Squill. Scilla.

1228. Ergot. Ergota.

1229. Opium. Opium.

a. Morphia. Morphia.

1230. Indian and American hemp. Cannabis Indica et Americana.

1231. Alcohol. Alcohol.

1232. Ether. Æther.

1233. Chloroform. Chloroformum.

1234. Hyoscyamus. Hyoscyamus. *Syn.* Henbane.

1235. Belladonna. Belladonna.

a. Atropia. Atropia.

1236. Stramonium. Stramonium. *Syn.* Jamestown weed.

1237. Prussic acid. Acidum hydrocyanicum.

a. Oil of bitter almonds. Oleum amygdalæ amaræ.

b. Laurel water. Aqua laurocerasi.

1238. Nitro-benzole. Nitro-benzoleum.

1239. Woorara. Curara. *Syn.* Wourali.

1240. Conium. Conium. *Syn.* Hemlock.

1241. Aconite. Aconitum.

a. Aconitia. Aconitia.

1242. Digitalis. Digitalis.

a. Digitalin. Digitalinum.

1243. Tobacco. Tabacum.

a. Nicotia. Nicotia.

1244. Hemlock dropwort. Œnanthe crocata.

1245. Nux vomica. Nux vomica.

a. Strychnia. Strychnia.

b. Brucia. Brucia.

1246. Upas tieute. Upas tieuticum.

1247. Upas antiar. Upas antiaricum.

1248. Calabar bean. Physostigma.

1249. Fool's parsley. Æthusa cynapium.

1250. Water hemlock. Cicuta virosa.

1251. Camphor. Camphora.

1252. Cocculus Indicus. Cocculus Indicus.

1253. Darnel. Lolium temulentum.

1254. Lobelia. Lobelia.

1255. Laburnum. Laburnum.

1256. Yew. Taxus baccata.

1257. Poisonous fungi. Fungi venenosi.

a. Mouldy bread. Panis mucidus.

1258. Poisonous grain. Grana venenosa.

a. Lathyrus. Lathyrus.

ANIMAL POISONS.
VENENA ANIMALIA.

1259. Cantharides. Cantharis. *Syn.* Spanish flies.

1260. Decayed and diseased meat. Caro rancida et morbida.

1261. Poisonous meat. Caro venenosa.

a. Sausages. Botuli.

1262. Poisonous cheese. Caseus venenosus.

1263. Poisonous milk. Lac venenosum.

1264. Poisonous fish. Pisces venenosi.

a. Mussels. Musculi.

GASEOUS POISONS.
VENENA AËRIA.

1265. Ammonia. Ammonia.

1266. Nitrous acid vapor. Acidi nitrosi vapor.

1267. Chlorine. Chlorinium.

1268. Carbonic acid. Acidum carbonicum.

1269. Carbonic oxide. Oxidum carbonicum.

1270. Coal gas. Carbonis vapor.

1271. Cyanogen. Cyanogenium.

1272. Sulphuretted hydrogen. Hydrogenii sulphuretum.

1273. Putrid and morbid exhalations. Exhalationes putridæ et pestiferæ.

1274. Other noxious effluvia. Aliæ exhalationes noxiæ.

MECHANICAL IRRITANTS.
CORPORA IRRITANTIA.

1275. Pounded glass. Vitrum contusum.

1276. Steel filings. Ferri ramenta.

POISONED WOUNDS.
VULNERA VENENO INFECTA.

Wounds inoculated with foreign matter, producing general symptoms of poisoning, or propagating inflammation to other parts of the body.

1277. By venomous animals. Ex animalibus venenosis.

a. Snakes. Serpentibus.

b. Scorpions. Scorpionibus.

c. Stinging insects. Insectis aculeatis.

1278. By animals having infectious disease. Ex animalibus morbis contagiosis afflictis.

a. Glanders. Equinia.

b. Farcy. Farciminum.

c. Grease. Equinia mitis.

d. Malignant pustule. Pustula maligna.

e. Rabies. Hydrophobia.

f. Cowpox. Vaccinia.

1279. By dead animal matter. Ex corporibus animalium mortuorum.

1280. By morbid secretions. Ex humoribus morbidis.

1281. By vegetable substances. Ex materia vegetabili.

a. By poisoned arrows. Ex sagittis venenatis.

b. By subcutaneous injection. Ex infusione hypodermica.

1282. By mineral substances. Ex materiâ minerali.

APPENDIX.

SURGICAL OPERATIONS.
OPERATIONES CHIRURGICÆ.

OPERATIONS ON THE EYE AND ITS APPENDAGES.
OPERATIONES CIRCA OCULUM APPENDICESQUE OCULI.

OPERATIONS ON THE EYELIDS.
OPERATIONES CIRCA PALPEBRAS.

For entropium. Adversus entropion.

For ectropium. Adversus ectropion.

For symblepharon and anchyloblepharon. Adversus symblepharon et anchyloblepharon.

For trichiasis. Adversus trichiasim.

For tumor of the eyelids. Adversus tumorem palpebrarum.

OPERATIONS ON THE OTHER APPENDAGES OF THE EYE.
OPERATIONES CIRCA CÆTERAS OCULI APPENDICES.

For strabismus. Adversus strabismum.

For pterygium. Adversus pterygium.

For fistula lachrymalis and lachrymal obstruction. Adversus fistulam lacrymalem et obstructionem lacrymalem.

For diseases of the lachrymal gland. Adversus morbos glandulæ lacrymalis.

OPERATIONS ON THE EYEBALL.
OPERATIONES CIRCA IPSUM OCULUM.

Artificial pupil. Pupilla factitia.

Iridectomy. Iridectomia.

Solution of the lens. Solutio lentis.

Depression of the lens. Depressio lentis.

Extraction of the lens. Detractio lentis.

Extraction of opaque capsule. Detractio capsulæ opacæ.

Extraction of foreign bodies. Detractio corporum adventitiorum.

Laceration of opaque capsule. Laceratio capsulæ opacæ.

Puncture of the globe. Punctio oculi.

For staphyloma. Adversus staphyloma.

Excision of the eyeball. Excisio oculi.

a. Partial. Ex parte.

b. Total. Ex toto.

c. With the rest of the contents of the orbit. Cum reliquis partibus intra orbitam sitis.

Removal of tumors from the neighborhood of the eye. Detractio tumorum oculo circumjacentium.

OPERATIONS ON ARTERIES.

OPERATIONES CIRCA ARTERIAS.

NOTE.—*The artery should be specified.*

Ligation. Deligatio.

Temporary constriction. Constrictio temporaria.

Acupressure. Acupressura.

Torsion. Torsio.

OPERATIONS ON ANEURISMS.

OPERATIONES CIRCA ANEURYSMATA.

NOTE.—*The seat of the aneurism should be specified.*

By compression of the artery. Compressio arteriæ.

By ligation of the artery. Deligatio arteriæ.

By incision of the sac. Sectio sacci.

By artificial coagulation of blood. Coagulatio sanguinis artificiosa.

By manipulation. Contrectatio.

By flexion of the limb. Flexio membri.

OPERATIONS ON VEINS.

OPERATIONES CIRCA VENAS.

Ligation of veins. Deligatio venarum.

Obliteration of varicose veins. Obliteratio varicum.

Obliteration of varicocele. Obliteratio cirsoceles.

Venesection. Venesectio.

OPERATIONS FOR HEMORRHAGE FROM MUCOUS CAVITIES.

OPERATIONES ADVERSUS HÆMORRHAGIAM EX CAVERNIS MUCOSIS.

Plugging of the nostrils. Obturatio narium.

Plugging of the vagina. Obturatio vaginæ.

Plugging of the rectum. Obturatio recti intestini.

OPERATIONS ON JOINTS.

OPERATIONES CIRCA ARTICULOS.

NOTE.—*The joints should be specified.*

Reduction of dislocations. Reductio luxationum.

Extension of stiff and deformed joints. Extensio rigidorum et deformium articulorum.

Incision of joints. Sectio articulorum.

Excision of joints. Excisio articulorum.

a. For injury. Injuriæ causâ.

Primary. Expedita.

Intermediate. Non-expedita.

Secondary. Prorogata.

b. For disease. Morbi causâ.

c. For deformity. Deformitatis causâ.

Removal of loose bodies. Detractio corporum liberorum.

OPERATIONS ON BONES.

OPERATIONES CIRCA OSSA

Excision of bones. Excisio ossium.

a. For injury. Injuriæ causâ.

Primary. Expedita.

Intermediate. Non-expedita.

Secondary. Prorogata.

b. For disease. Morbi causâ.

c. For deformity. Deformitatis causâ.

From the head. Ex capite.

Trephining. Terebratio.

From the trunk. Ex trunco.

From the upper extremities. Ex membris superioribus.

From the lower extremities. Ex membris inferioribus.

Operations for ununited fracture. (Specify which bone.) Operationes adversus fracturam non-coieuntem.

Refracture of bone. (Specify which bone.) Refractura ossium.

AMPUTATIONS.

AMPUTATIONES.

Amputation for injury. Amputatio injuriæ causâ.

a. Primary. Expedita.

b. Intermediate. Non-expedita.

c. Secondary. Prorogata.

Amputation for disease. Amputatio morbi causâ.

Amputation for deformity. Amputatio deformitatis causâ.

Amputation of the scapula and arm. Amputatio scapulæ et brachii.

Of the shoulder-joint. Humeri.

Of the arm. Brachii.

Of the forearm. Antibrachii.

Of the hand. Manûs.

At the wrist-joint. A carpi articulo.

Of parts of the hand. Partium manûs singularum.

Of the fingers. Digitorum.

Of the hip-joint. Ad sinum coxæ.

Of the thigh. Femoris.

Of the knee-joint. Genu.

Of the leg. Cruris.

Of the ankle-joint. Articuli talaris.

Across the foot. Pedis transversi.

Of the metatarsal bones. Ossium metatarsi.

Of the toes. Digitorum pedis.

REMOVAL OF TUMORS.

DETRACTIO TUMORUM.

NOTE.—*State whether by knife, ligature, écraseur, caustic, or galvanic cautery; specify the locality of the growth; and arrange according to the list of tumors (page 6).*

REMOVAL OF FOREIGN BODIES.

DETRACTIO CORPORUM ADVENTITIORUM.

Of loose cartilages. Cartilaginum liberarum.

Of balls. Glandium plumbearum.

Of other imbedded or impacted substances. Aliarum rerum penitus conditarum vel inhærentium.

REMOVAL OF CALCULI.

DETRACTIO CALCULORUM.

Of salivary calculi. Calculorum salivosorum.

Of biliary calculi. Calculorum felleorum.

Of vesical calculi. Calculorum ex vesicâ.

a. By lithotomy. Lithotomia.

Supra-pubic. Supra pubem.

Lateral. Ab alterutro latere.

Bilateral. Ab utroque latere.

Median. A mediâ parte.

Recto-vesical. A parte recti intestini.

b. By lithotrity. Lithotripsis.

c. By dilatation of female urethra. Dilatatio urethræ fœmineæ.

d. By extraction of fragments. Evulsio fragmentorum.

INCISIONS.

SECTIONES.

NOTE.—*If subcutaneous, to be so stated.*

Neurotomy. Neurotomia.

Laryngotomy. Laryngotomia.

Tracheotomy. Tracheotomia.

Removal of foreign bodies from the windpipe. Evulsio ex gutture corporum adventitiorum.

Œsophagotomy. Œsophagotomia.

Gastrotomy (opening the stomach). Gastrotomia.

Abdominal section (exploratory operation on the intestines). Sectio abdominis.

Colotomy. Colotomia.

a. Inguinal. A parte inguinis.

b. Lumbar. A parte lumborum.

For hernia. Adversus herniam.

Noté.—The nature of the hernia to be stated.

a. For strangulated hernia. Adversus herniam strangulatam.

Opening the sac. Aperiendo velamento.

Without opening the sac. Illæso velamento.

b. Radical cure. Restitutio in integrum.

For stricture of the rectum. Adversus strictūram recti intestini.

Incision of the sphincter ani. Sectio sphincteris ani.

For fistula in ano. Adversus fistulam in ano.

For anal fissure. Adversus fissuram in ano.

For ulcer of the rectum. Adversus ulcus recti intestini.

External urethrotomy. Urethrotomia exterior.

Internal urethrotomy. Urethrotomia interior.

Sudden dilatation or rupture of stricture. Dilatatio prompta vel diruptio strictūræ.

Ovariotomy. Exsectio ovarii.

Cæsarean section. Sectio Cæsarea.

Removal of fœtal remains. Detractio reliquiarum fœtus.

Tenotomy. Tenontomia.

Myotomy. Myotomia.

Vaccination. Vaccinatio.

REPARATIVE OPERATIONS.

OPERATIONES REFICIENTIÆ.

For chronic ulcer. Adversus ulcus vetustum.

For abdominal fistula. Adversus fistulam abdominis.

For cicatrices. Adversus cicatrices.

a. Of the nose. Nasi.

b. Of the eyelids. Palpebrarum.

c. Of the lips. Labiorum.

d. Of the neck. Cervicis.

e. Of the limbs. Membrorum.

For recto-urethral fistula. Adversus fistulam recto-urethralem.

For recto-vaginal fistula. Adversus fistulam recto-vaginalem.

For utero-vesical fistula. Adversus fistulam utero-vesicalem.

For vesico-vaginal fistula. Adversus fistulam vesico-vaginalem.

For perineal rupture. Adversus perinei diruptionem.

For protrusion of the tubuli of the testis, or fungus testis. Adversus fungum testiculi.

For deformities. Adversus deformitates.

a. For harelip. Adversus labrum leporinum.

b. For cleft palate. Adversus palatum fissum.

c. For phimosis. Adversus phimosim.*

OPERATIONS NOT CLASSIFIED.

OPERATIONES NON IN CLASSES DISTRIBUTÆ.

Tapping. Paracentesis.

a. Tapping the head. Paracentesis capitis.

b. Tapping a spina bifida. Paracentesis spinæ bifidæ.

c. Tapping the chest. Paracentesis thoracis.

d. Tapping the pericardium. Paracentesis pericardii.

e. Tapping the abdomen. Paracentesis abdominis.

f. Tapping an ovarian cyst. Paracentesis ovarii.

g. Tapping the bladder. Paracentesis vesicæ.

Above the pubes. Supra pubem.

Through the rectum. Per rectum intestinum.

h. Tapping a hydrocele. Paracentesis hydroceles.

i. Tapping fluid tumors. Paracentesis tumorum fluidorum.

Transfusion. Transfusio.

Artificial respiration. Respiratio artificiosa.

Resuscitation of drowned persons. Restitutio animæ in demersis.

Resuscitation of hanged persons. Restitutio animæ a suspendio.

* For other deformities, see the list at page 88.

HUMAN PARASITES.

NOTE.—*The parasites are to be returned under local diseases.*

SUBDIVISIONS.

1. ENTOZOA.
2. ECTOZOA.
3. ENTOPHYTA AND EPIPHYTA.

ENTOZOA.

CLASSES.

A. CŒLELMINTHA. *Syn.* Hollow worms.
Worms with an abdominal cavity.

B. STERELMINTHA. *Syn.* Solid worms.

C. ACCIDENTAL PARASITES.
Internal parasites, having the habits, but not referable to the class, of entozoa.

CLASS A. CŒLELMINTHA.

1. Ascaris lumbricoides. (Linnæus.) *Habitat:* Intestines.
2. Ascaris mystax. (Rudolphi.) *Habitat:* Intestines.
3. Trichocephalus dispar. (Rudolphi.) *Habitat:* Intestines.
4. Trichina spiralis. (Owen.) *Habitat:* Muscles.
5. Filaria Medinensis. (Gmelin.) *Syn.* Dracunculus Medinensis; Guinea worm. *Habitat:* Skin and subcutaneous tissues.
6. Filaria oculi. (Nordman.) *Syn.* Filaria lentis. (Diesing.) *Habitat:* Eye.
7. Strongylus bronchialis. (Cobbold.) *Habitat:* Bronchial tubes.
8. Eustrongylus gigas. (Diesing.) *Habitat:* Kidney; intestines.
9. Sclerostoma duodenale. (Cobbold.) *Syn.* Anchylostomum duodenale. *Habitat:* Duodenum.
10. Oxyuris vermicularis. (Bremser.) *Syn.* Threadworm. *Habitat:* Rectum.

CLASS B. STERELMINTHA.

11. Bothriocephalus latus. (Bremser.) *Habitat:* Intestines.
12. Bothriocephalus cordatus. (Leuckart.) *Habitat:* Intestines.
13. Tænia solium. (Linnæus.) *Habitat:* Intestines.

14. Cysticercus of the Tænia solium. *Syn.* Cysticercus telæ cellulosæ.

15. Tænia mediocanellata. (Küchenmeister.) *Habitat:* Intestines.

16. Tænia acanthotrias. (Weinland.) *Habitat:* Intestines.

17. Tænia flavopuncta. (Weinland.) *Habitat:* Intestines.

18. Tænia nana. (Siebold.) *Habitat:* Intestines.

19. Tænia lophosoma. (Cobbold.) *Habitat:* Intestines.

20. Tænia elliptica. (Batsch.) *Habitat:* Intestines.

21. Cysticercus of the Tænia marginata. *Syn.* Cysticercus tenuicollis.

22. Echinococcus hominis, *or* Hydatid of the Tænia echinococcus. (Siebold.)

23. Fasciola hepatica. (Linnæus.) *Habitat:* Liver.

24. Distoma crassum. (Busk.) *Habitat:* Duodenum.

25. Distoma lanceolatum. (Mehlis.) *Habitat:* Hepatic duct; intestines.

26. Distoma ophthalmobium. (Diesing.) *Habitat:* Eye.

27. Distoma heterophyes. (Siebold.) *Habitat:* Small intestines.

28. Bilharzia hæmatobia. (Cobbold.) *Habitat:* Portal and venous blood.

29. Tetrastoma renale. (Della Chiaje.) *Habitat:* Tubes of the kidney.

30. Hexathyridium venarum. (Treutler.) *Habitat:* Venous blood.

31. Hexathyridium pinguicola. (Treutler.) *Habitat:* Ovary.

Class c. Accidental Parasites.

32. Pentastoma denticulatum. (Siebold.) *Habitat:* Liver; small intestines.

33. Pentastoma constrictum. *Habitat:* Liver.

34. Œstrus hominis. (Say.) *Syn.* Larva of the gad-fly. *Habitat:* Intestines.

35. Anthomyia canicularis. (A. Farre.) *Habitat*: Intestines.

ECTOZOA.

36. Pediculus pubis. (Leach.) *Syn.* Crab-louse.

37. Pediculus capitis. (Nitzsch.) *Syn.* Head-louse.

38. Pediculus palpebrarum. (Le Jeune in Guillemeau.) *Syn.* Brow-louse.

39. Pediculus vestimenti. (Nitzsch.) *Syn.* Body-louse.

40. Pediculus tabescentium. (Burmeister.)

41. Sarcoptes scabiei. (Latreille.) *Syn.* Acarus. Itch-insect.

42. Demodex folliculorum. (Owen.)

43. Pulex penetrans. (Gmelin.) *Syn.* Chigoe. *Habitat:* Skin and cellular tissue.

ENTOPHYTA AND EPIPHYTA.

44. Leptothrix buccalis. (Wedl. Robin.) *Syn.* Alga of the mouth.

45. Oidium albicans. (Link.) *Syn.* Thrush fungus. *Habitat:* Mouth in cases of thrush, and certain mucous and cutaneous surfaces.

46. Sarcina ventriculi. (Goodsir.) *Habitat:* Stomach.

47. Torula cerevisiæ. (Turpin.) *Syn.* Cryptococcus cerevisiæ. (Kützing.) *Syn.* Yeast-plant. *Habitat:* Stomach; bladder, &c.

48. Chionyphe Carteri.

A cotton fungus occurring in the disease called Mycetoma. *Habitat:* Deep tissues, and bones of the hands and feet.

49. Achorion Schönleinii. (Remak.) *Habitat:* Tinea favosa.

Note.—To be returned amongst the parasitic diseases of the skin.

50. Puccinia favi. (Ardsten.) *Habitat:* Tinea favosa.

Note.—To be returned amongst the parasitic diseases of the skin.

51. Achorion Lebertii. (Robin.) *Syn.* Trichophyton tonsurans. (Malmsten.) *Habitat:* Tinea tonsurans.

Note.—To be returned amongst the parasitic diseases of the skin.

52. Microsporon Audouini. (Gruby.) *Habitat:* Tinea decalvans.

Note.—To be returned amongst the parasitic diseases of the skin.

53. Trichophyton sporuloides. (Von Walther.) *Habitat:* Tinea polonica.

Note.—To be returned amongst the parasitic diseases of the skin.

54. Microsporon furfur. (Eichstädt.) *Habitat:* Tinea versicolor.

Note.—To be returned amongst the parasitic diseases of the skin.

55. Microsporon mentagrophytes. (Gruby.) *Habitat:* Follicles of hair in Sycosis or Mentagra.

Note.—To be returned amongst the parasitic diseases of the skin.

The foregoing list might be extended by the addition of various parasitic vegetations, which have been reported under the names of Algæ, Fungi, Mycoderms, Leptomiti, &c., but the characters or the existence of which are still the subject of inquiry.

CONGENITAL MALFORMATIONS.
DEFORMITATES CONGENITÆ.

MALFORMATIONS RESULTING FROM INCOMPLETE DEVELOPMENT OR GROWTH OF PARTS.

DEFORMITATES CONGENITÆ EX RUDI EVOLUTIONE VEL INCREMENTO PARTIUM EXORTÆ.

OF THE BODY GENERALLY.
CORPORIS UNIVERSI.

Head absent, or rudimentary. Caput aut nullum aut rude.

Cranium defective. Calvaria curta.

Lower jaw absent or defective. Maxilla inferior aut nulla aut curta.

Upper and lower extremities absent. Defectio partium extremarum superiorum et inferiorum.

Lower extremities absent. Defectio membrorum inferiorum.

One lower extremity absent. Defectio membri inferioris alterutrius.

Hands and feet articulated to scapulæ and pelvis. Manus pedesque scapularum et coxarum ossibus inserti.

Fingers and toes deficient in number. Manuum pedumque digiti numero deficientes.

OF THE NERVOUS SYSTEM.
NERVORUM APPARATUS.

Brain absent. Defectio cerebri.

Brain rudimentary or incompletely developed. Cerebrum rude vel minus absolutum.

Spinal cord absent or imperfect. Medulla spinæ aut nulla aut inchoata.

Continuity of nerves with nerve-centres incomplete. Nervorum cum centris suis imperfecta commissura.

OF THE ORGANS OF SPECIAL SENSE.
SENSUUM SINGULARIUM APPARATUS.

Eyes absent. Defectio oculorum.

Eyes imperfect. Oculi curti.

Eyelids incomplete. Palpebræ imperfectæ.

Eyelids remaining united. Palpebrarum perpetua conjunctio.

External ear absent. Defectio auris exterioris.

Pinna adherent. Auricula adhærens.

Meatus externus closed. Foramen auris clausum.

Internal ear imperfect. Auris interior curta.

Nose absent. Defectio nasi.

Nose imperfect. Nasus curtus.

Nose resembling a proboscis. Nasus proboscidi similior.

OF THE VASCULAR SYSTEM.
SANGUINIS APPARATUS.

Heart absent. Defectio cordis.

Cavities of heart deficient in number. Cava cordis numero deficientia.

a. One auricle and one ventricle. Singula auricula cum singulo ventriculo.

b. Two auricles and one ventricle. Binæ auriculæ cum singulo ventriculo.

Septa incomplete. Septa imperfecta.

a. Auricular. Septum auricularum.

b. Ventricular. Septum ventriculorum.

Orifices obstructed or imperfect. Ostia obstructa vel imperfecta.

a. Right auriculo-ventricular aperture. Ostium dextrum auriculam inter ventriculumque.

b. Pulmonic aperture. Ostium pulmonale.

c. Left auriculo-ventricular aperture. Ostium sinistrum auriculam inter ventriculumque.

d. Aortic aperture. Ostium aorticum.

Foramen ovale prematurely closed. Foramen ovale præmature clausum.

Ductus arteriosus prematurely closed. Ductus arteriosus præmature clausus.

Origins of aorta and pulmonary artery transposed. Capita aortæ et arteriæ pulmonalis inter se transposita.

Origin of ascending aorta from left ventricle and of descending aorta from right ventricle, through the ductus arteriosus. Aorta ascendens a sinistro ventriculo orsa, descendens a dextro per ductum arteriosum.

Commencement of descending aorta contracted or obliterated. Caput aortæ descendentis coarctatum vel obliteratum.

Foramen ovale persistent. Foramen ovale a partu patens.

Ductus arteriosus pervious. Ductus arteriosus a partu pervius.

Cardiac valves imperfect. Valvæ cordis imperfectæ.

Pericardium absent. Defectio pericardii.

OF THE RESPIRATORY SYSTEM.
RESPIRATIONIS APPARATUS.

Lungs (one or both) absent. Defectio pulmonum (alterutrius vel utriusque).

Pulmonary lobes deficient in number. Pulmonum lobi numero deficientes.

Larynx and trachea absent or imperfect. Larynx et trachea aut nulla aut inchoata.

OF THE DIGESTIVE SYSTEM.
DIGESTIONIS APPARATUS.

Œsophagus impervious. Œsophagus impervius.

Intestine impervious, or deficient in various regions. Intestina impervia vel deficientia in variis partibus.

Anus impervious. Anus impervius.

Anus in unusual situations. Anus in alieno situ.

Liver preternaturally small. Jecur præter naturam exiguum.

Gall-bladder absent. Defectio vesiculæ fellis.

Biliary ducts impervious. Ductus jecinoris impervii.

Urachus patulous. Urachus patens.

Vitelline duct patulous. Ductus Vitellinus patens.

OF THE URINARY SYSTEM.
URINÆ APPARATUS.

Kidney (one or both) absent. Defectio renum (alterutrius vel utriusque).

Kidney lobulated. Renes multifidi.

Ureters absent or impervious. Ureteres aut nulli aut impervii.

Urachus persistent. Urachus perstans.

OF THE MALE ORGANS OF GENERATION.
GENITALIUM VIRILIUM.

Penis diminutive, resembling a clitoris. Coles pusillus, clitoridi similior.

Prepuce abbreviated—elongated. Præputium justo brevius—justo longius.

Testicle (one or both) absent. Defectio testiculorum (alterutrius vel utriusque).

External organs absent. Defectio partium exteriorum.

OF THE FEMALE ORGANS OF GENERATION.
GENITALIUM MULIEBRIUM.

Ovary (one or both) absent. Defectio ovariorum (alterutrius vel utriusque).

Uterus absent. Defectio uteri.

Vagina absent. Defectio vaginæ.

Vagina impervious. Vagina impervia.

Vagina a cul-de-sac. Vagina in sinum desinens.

External organs absent. Defectio partium exteriorum.

MALFORMATIONS RESULTING FROM INCOMPLETE COALESCENCE OF THE LATERAL HALVES OF PARTS WHICH SHOULD BECOME CONJOINED.

DEFORMITATES CONGENITÆ EX PARUM COËUNTIBUS AB UTROQUE LATERE PARTIBUS DIMIDIIS, QUÆ DEBUERANT CONJUNGI.

A.—ON THE ANTERIOR MEDIAN PLANE.
MEDIARUM REGIONUM A PRIORI PARTE.

Fissure of the face. Fissura faciei.

Fissure of the iris. Fissura iridis. *Syn.* Coloboma.

Fissure of the lip. Fissura labri.

a. Single harelip. Labrum leporinum simplex.

b. Double harelip. Labrum leporinum duplex.

Fissure of the palate. Fissura palati.

a. Hard palate. Palati duri.

b. Soft palate. Palati mollis.

Fissure of the nose. Fissura nasi.

Naso-buccal fissure. Fissura nasi et buccarum.

Fissure of the sternum. Fissura sterni.

Fissure of the diaphragm. Fissura diaphragmatis.

Fissure of the abdominal walls. Fissura abdominis.

Fissure of the pubic symphysis. Fissura commissuræ pectinis.

Extroversion of the bladder. Vesicæ extroversio.

Epispadias. Epispadias.

Hypospadias. Hypospadias.

Fissure of the scrotum. Fissura scroti.

B.—ON THE POSTERIOR MEDIAN PLANE.
MEDIARUM REGIONUM A TERGO.

Fissure of the skull. Fissura calvariæ.

Fissure of the spinal column. Fissura vertebrarum in spinâ. *Syn.* Spina bifida.

a. Complete. Ex toto.

b. Partial. Ex parte.

Cervical region. Cervicis.

Lumbar region. Lumborum.

Sacral region. Sacri.

Fissure of the spinal cord. Fissura medullæ spinalis.

MALFORMATIONS RESULTING FROM COALESCENCE OF THE LATERAL HALVES OF PARTS WHICH SHOULD REMAIN DISTINCT.

DEFORMITATES CONGENITÆ EX COEUNTIBUS AB UTROQUE LATERE DIMIDIIS PARTIBUS, QUÆ DEBUERANT IN PERPETUUM DISSOCIARI.

Lower extremities conjoined. Membra inferiora commissa. *Syn.* Syreniform fœtus.

Fingers or toes conjoined. Digiti cohærentes.

Cyclops. Unoculus. *Syn.* Monoculus.

Double kidney. Renes in unum conjuncti.

MALFORMATIONS RESULTING FROM THE EXTENSION OF A COMMISSURE BETWEEN THE LATERAL HALVES OF PARTS (CAUSING APPARENT DUPLICATION).

DEFORMITATES CONGENITÆ EX LATIUS PATENTE COMMISSURA DIMIDIARUM A LATERIBUS PARTIUM (DUPLICATA OMNIA REPRÆSENTANTES).

Double uterus. Uterus duplex.

Double vagina. Vagina duplex.

MALFORMATIONS RESULTING FROM REPETITION OR DUPLICATION OF PARTS IN A SINGLE FŒTUS.

DEFORMITATES CONGENITÆ EX REPETITIS IN DUPLUM PARTIBUS SINGULORUM FŒTUUM.

Supernumerary fingers and toes. Superantes numero digiti.

Supernumerary cavities of the heart. Superantia numero cava cordis.

Supernumerary valves of the heart. Superantes numera valvæ cordis.

MALFORMATIONS RESULTING FROM THE COALESCENCE OF TWO FŒTUSES, OR OF THEIR PARTS.

DEFORMITATES EX COHÆRENTIBUS INTER SE BINIS FŒTIBUS, SIVE EX TOTO SIVE EX PARTE.

Fœtus, more or less perfect, contained within another fœtus. Fœtus, plus minus absolutus, alio in fœtû inclusus.

Fœtus, more or less perfect, constituting a tumor covered by integument. Fœtus, plus minus absolutus, tumorem repræsentans cute obductum.

Double fœtus. Fœtus duplex.

a. One perfect. The other an appendage. Altera pars integra. Altera appendix tantummodo.

b. Both more or less perfect. Utraque pars plus minus integra.

The middle parts united. The upper and lower distinct. Partes mediæ continentes. Superiora et inferiora discreta.

The upper parts united. The lower distinct. Superiora continentia. Inferiora discreta.

The lower parts united. The upper distinct. Inferiora continentia. Superiora discreta.

CONGENITAL DISPLACEMENTS AND UNUSUAL POSITIONS OF PARTS OF THE FŒTUS.

MUTATIO LOCI ET POSITURA INUSITATA IN FŒTU CONGENITA.

Transposition of viscera. Viscera inter se transposita.

Hernia or ectopia of the brain. Hernia *sive* ectopia cerebri.

Hernia or ectopia of the heart. Hernia *sive* ectopia cordis.

Hernia or ectopia of the lungs. Hernia *sive* ectopia pulmonum.

Hernia or ectopia of the intestines. Hernia *sive* ectopia intestinorum.

Varieties.

Through the diaphragm. Diaphragmatic hernia. Hernia diaphragmatica.

Through the abdominal walls. Abdominal hernia. Hernia abdominalis.

Through the umbilicus. Umbilical hernia. Hernia umbilicalis.

Extroversion of the bladder. Vesicæ extroversio.

Testicle retained in the abdomen. Testiculus in ventre retentus.

Testicle retained in the inguinal canal. Testiculus in foramine inguinali.

DISEASES MANIFESTED AT OR AFTER BIRTH.
MORBI A PARTU IPSO VEL POST PARTUM APPARENTES.

Premature birth. **Partus intempestivus.**

Stillbirth. **Partus intus emortuus.**

Imperfect expansion of air cells. **Atelectasis pulmonum.**

Jaundice. **Icterus.**

Idiotcy. **Amentia.**

Dumbness. **Infantia linguæ.**

Deaf-dumbness. **Mutorum surditas.**

Congenital cataract. **Suffusio congenita.**

Cephalæmatoma. **Cephalæmatoma.**

Syphilis. **Syphilis.**

AUG
68

AUG
68

3 2044 102 980